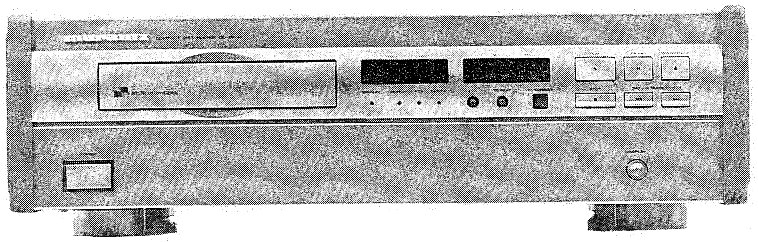
Service Manual

74CD11MK2 / 20G

Compact disc player



CONTENTS

SECTION PAGE

SHOCK FIRE HAZARD SERVICE TEST

1. TECHNICAL SPECIFICATIONS ---------- 1
2. NOTES ON BALANCED OUTPUTS CONNECTORS ---------- 2
3. IC PIN FUNCTIONS ---------- 4
4. BLOCK DIAGRAM ---------- 9
5. SCHEMATIC DIAGRAM AND PARTS LOCATIONS (PATTERN SIDE) ---------- 11
6. CONNECTION DIAGRAM ---------- 39
7. EXPLODED VIEW AND MECHANICAL PARTS LIST, LASER RADIATION SAFETY ---------- 41
8. TRAY MECHANISM LOADING PROCEDURES ---------- 47
9. PRACTICAL HINTS ---------- 49
10. INITIATING THE SERVICE PROGRAMME ---------- 50
11. MEASUREMENTS AND ADJUSTMENT FOR CDM4 (SUB CHASSIS) ---------- 52
12. DETAILED MEASURING METHOD FOR THE SERVO + PRE-AMPLIFIER CIRCUIT ---------- 53
13. DETAILED MEASURING METHOD FOR THE DECODER CIRCUIT ---------- 56
14. ELECTRICAL PARTS LIST ---------- 59

marantz®

model CD-11MK2

First issue : 1991
4822 725 50957

MZ 3126

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound.
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ORDERING PARTS:

Parts can be ordered either by mail or by telex. In both cases, correct part number has to be specified.
The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature: any order form or telex must be signed otherwise such part order will be considered as null and void.

PARTS ORDERING

Parts may be ordered at the following addresses:

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Industrialaan 1
1720 Groot-Bijgaarden
Belgium
Telex: 24466

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92600 Asnières
France
Telex: 611651

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Alexanderstrasse 1
2000 Hamburg
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Box 1324
171 25 Solna

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00520 Helsingfors 52

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Padbury oaks
575-583 Bath Road
Long ford
Middlesex UB7 OEH
Faxnr.: 0753 680 428

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P.O.Box 21025
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Athens 11471
Greece
Telex: 216.795

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Sagamihara-shi, Kanagawa
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AL ALAMIAH ELECTRONICS
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P.O.Box 23781
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Telex: 22694

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20126 Milano
Italy

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Saudi Arabia
Telex: 401530

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Newville 21114
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28012 Madrid
faxnr.: 3412 306 198

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I.M.C.
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Istanbul
Turkey
Telex: 22085

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CACHIA & GALEA
Republic Street, 68D
Valetta
Telex: 1682

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Divisao philips S.A. service
Outurela-carnaxide
2795 LinDA-A-VELHA
Telex: 43906

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please, contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at abovementioned address.

1 TECHNICAL SPECIFICATIONS

Audio Characteristics

Channels	2 channels
D/A conversion	1-bit linear/channel

Frequency Characteristics

Line output jack	20 to 20,000Hz, ±0.2dB
BALANCED output jack	20 to 20,000Hz, ±0.2dB
Dynamic range	96dB
S/N ratio	108dB
Channel separation	100dB or more (1kHz)
THD	0.0015% (1kHz)
Wow & flutter	Precision of quartz
Analog output jacks	
Line output jacks	Output level 2V RMS Output impedance 100ohms
Matching load impedance	10kohms or more
BALANCED output jack	Output level 3V RMS Output impedance 100ohms
Matching load impedance	Balanced 600ohms Unbalanced 600 ohms to 50kohms
Digital output	Pin jack, 0.5Vp-p/75ohms (Rectangular optical connector) optical output -19dBm

Optical Readout System

Laser	AlGsAs semiconductor
Wavelength	780nm

Signal System

Sampling frequency	44.1kHz
Quantization	16-bit linear/channel
Error correction	Cross-interleave reed solomon code (CIRC), Class A D/A conversion

Power Supply

Power Requirements	AC 220V/240V 50Hz or 60Hz
Power Consumption	Approx. 18W

Cabinet, etc.

Dimensions	
Width	454mm
Height	122mm
Depth	342mm
Weight	Approx. 16.7kg
Operating temperature	+5°C ~ +35°C
Operating humidity	5% ~ 65% (without Dew)

Accessories

Remote control unit (RC-11 MK2 CD)	1
Dimensions (W x H x D)	82 x 29 x 220mm
Weight (without batteries)	200g
R03 Batteries	2
Stereo audio cable with RCA pins	1 pair
Stereo audio cable with XLR pins	1 pair
Digital signal cable with RCA pins	1

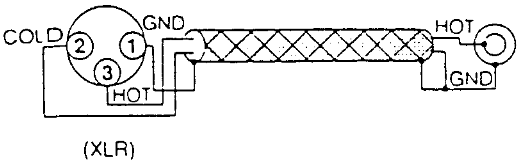
* Improvement may result in changes in specifications and design without notice.

2 NOTES ON BALANCED OUTPUTS CONNECTORS

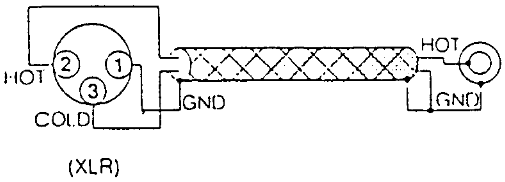
The BALANCED output connectors uses XLR connectors.

There are two types of professional-type internal wiring methods for XLR connectors.

1. ***USA method*** (Pin 2 = COLD, Pin 3 = HOT)

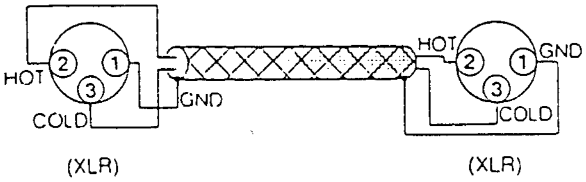

COLD
GND
HOT
2
1
3
HOT
GND
(XLR)

2. ***Europe method*** (Pin 2 = HOT, Pin 3 = COLD)


HOT
2
1
3
COLD
GND
HOT
GND
(XLR)

The models use the USA method described in 1 above.

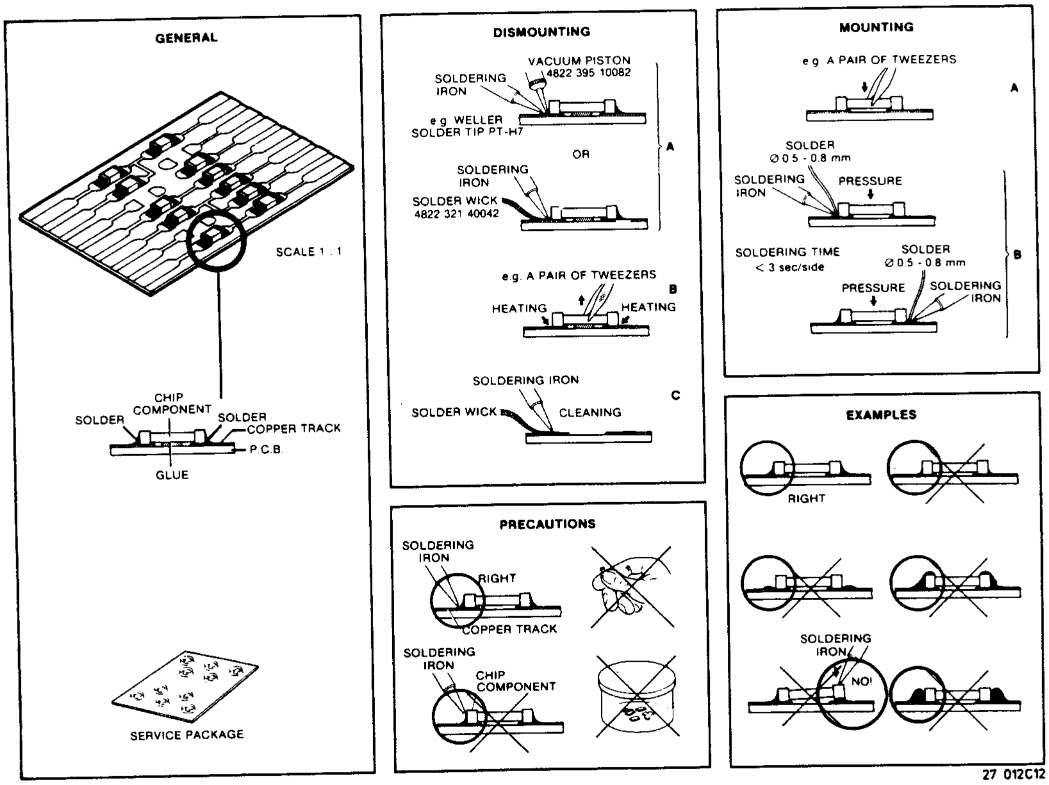
When XLR connector cables are used and if your preamplifier or main amplifier uses the Europe method, the reproduced signal may be out of phase.
In this case, change the connections of pin 2 and pin 3 of one of the XLR connectors of the cable to the USA method.
Also when you use an XLR balanced cable (see illustration below) and if the preamplifier or main amplifier uses the Europe method, change the connections of pin 2 and pin 3 of one of the XLR connectors of the cable to the USA method.


HOT
2
1
3
COLD
GND
HOT
2
1
3
GND
COLD
(XLR)
(XLR)

Now the signal can be reproduced in proper phase.

SERVICE TOOLS

Audio signals disc	4822 397 30184
Disc without errors (test disc 5) + disc with DO errors, black spots and fingerprints (test disc 5A)	4822 397 30096
Disc 65 min 1 kHz without pause	4822 397 30155
Max. diameter disc(58.0 mm)	4822 397 60141
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204
Service cable (4p)	4822 321 21284
Service flexfoil (14p)	4822 322 40066
Service connector (14p)	4822 267 50676
Green LED CQY G11	5322 130 32182
Insulation cover	4822 444 60655


GENERAL
SCALE 1 : 1
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON
4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
SOLDERING IRON
SOLDER WICK
4822 321 40042
A
e.g. A PAIR OF TWEEZERS
B
HEATING
HEATING
SOLDERING IRON
SOLDER WICK
CLEANING
C
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
Ø 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
< 3 sec/side
SOLDER
Ø 0.5 - 0.8 mm
B
PRESSURE
SOLDERING IRON
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12

ESD

(GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

(NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgiältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

3 IC PIN FUNCTIONS

Q101 : TDA8808T

pin	mnemonic	description
1	GCHF	Gain control input of HF amplifier. Current output from HF amplitude detector
2	V_P	Positive supply voltage
3	HFout	HF amplifier and equalizer voltage output
4	DET	HF detector voltage input
5	Sc	Starting up capacitor input
6	$Si/\overline{RD}$	On/off control (start input); ready signal output (starting up procedure successful)
7	Beq	Equalizer reference current input
8	Bgc	DC and LF gain control reference current input
9	FOC START	Focus normalizing circuit starting current
10	PLLH	PLL on hold output
11	$\overline{TL}$	Track loss output
12	$\overline{DODS}$	Drop out detector suppression input
13	V_{ext}	TDA8808T Negative supply connection for FE and FElag output stage; also substrate connection TDA8808AT Positive supply connection for FE and FElag output stage
14	LPF	Low pass filter for I_{ret}, used in track loss ($\overline{TL}$) detector and LF gain control
15	FE	Current output of normalized, switched focus error signal
16	FElag	Current output of switched focus error signal, intended for lag network
17	LO	Laser amplifier current output
18	LM	Laser monitor diode input
19	GCLF	Gain control input for AC and LF amplifiers. Current output from LF amplitude detector
20	Re2	Summation of amplified currents from D3 and D4
21	Re1	Summation of amplified currents from D1 and D2
23, 22	D1, D2	Current inputs to DC and LF photo diode amplifier
24, 25	D3, D4	Current inputs to DC and LF photo diode amplifier
26	HFin	Current input to HF amplifier
27	GND	Ground connection of device: also substrate connection for TDA8808AT
28	DEC	Decoupling input (internal bypass)

Q103 : TDA8809T

pin	mnemonic	description
1	V_P	Positive supply voltage
2	C_{osc1}	Frequency setting capacitors for oscillator
3	C_{osc2}	
4	R_{wob}	Wobble generator input
5	R_{osc}	Biassing resistor for oscillator frequency and internal amplitude
6	$\overline{DIV4}$	Divide-by-4 input
7	REdig	Digital output of sign (Re2 - Re1)
8	B3	Input control bits for off-, catch-, play-status and DAC output current
9	B2	
10	B1	
11	B0	
12	$V_{ext(+)}$	Positive external voltage input
13	$V_{ext(-)}$	Negative external voltage input (also substrate connection)
14	GND	Negative supply connection
15	RADout	Current output of amplified (Re2 - Re1) input currents
16	REin	Radial error input
17	RElag	Voltage output of integrated (Re2 - Re1) input currents
18	Lag	Connection of integrator capacitor for (Re1 - Re2) input currents
19	Lead	Lead output
20	V_{ref}	Internal reference voltage output
21	AGC	Gain control input for radial error signal
22	R_{DAC}	Biassing resistor for current output for track jumping (3½ bits)
23	offset in	Offset control input for radial offset
24	offset out	Offset control output for radial offset
25	C_{LPF}	Low-pass filter for Re1 and Re2, used for radial offset control
26	C_{HPF}	High-pass filter for Re1 and Re2, used for radial offset control
27	Re1	Input for amplified currents from photo-diodes D1 and D2
28	Re2	Input for amplified currents from photo diodes D3 and D4

Q501 : SAA7310 (1/3)

pin no.	mneumonic	description
QFP		
7 - 14	A0 - A7	**Address:** address outputs to external RAM.
15	$\overline{\text{RAS}}$	**Row Address Select:** output to external RAM (4416) which uses multiplexed address inputs.
16	R/$\overline{\text{W}}$	**Read/Write:** output signal to external RAM.
18	$\overline{\text{MUTE}}$	**Mute:** input from the microprocessor. When mute is LOW the data output DAAB, pin 37 (2), is attenuated to zero in 15 successive divide-by-2 steps. On the rising edge of mute the data output is incremented to the first 'good' value in 2 steps. This input has an internal pull-up of 50 kΩ (typ.).
19 - 21	D1 - D3	**Data:** data inputs/outputs to external RAM.
22	$\overline{\text{CAS}}$	**Column Address Select:** output signal to external RAM.
23	D4	**Data:** data input/output to external RAM.
24	MSC	**Motor Speed Control:** open drain output which provides a pulse width modulated signal with a pulse rate of 88 kHz to control the rate of data entry. The duty factor varies from 1,6% to 98,4% in 62 steps. When a motor-start signal is detected via pin 33 (42) (SWAB/SSM) the duty factor is forced to 98,4% for 0,2 seconds followed by a normal calculated signal. After a motor-stop signal is detected the duty factor is forced to 1,6% for 0,2 seconds, followed by a continuous 50% duty factor.
25	XTAL2	**Crystal oscillator output:** drive output to clock crystal (11,2896 MHz typ.).
26	XTAL1	**Crystal oscillator input:** input from crystal oscillator or slave clock.
27	V_{SS}	**Ground:** circuit earth potential.
28	V_{DD}	**Power Supply:** positive supply voltage (+ 5 V).
29	PD/OC	**Phase Detector output/ Oscillator Control input:** outputs of the frequency detector and phase detector are summed internally, then filtered at this pin to provide the frequency control signal for the VCO.
30	I_{ref}	**Current reference:** external reference input to the phase detector and data slicer. This input is required to minimize the spread in the charge pump output of the phase detector and data slicer.
31	FB	**Feedback:** output from the input data slicer. This output is a current source of 100 µA (typ.) which changes polarity when the level detector input HFI at pin 25 (32) rises above the threshold voltage of 2 V (typ.). When a data run length violation is detected (e.g. during drop-out), or when HFD at pin 26 (34) is LOW, this output goes to a high impedance state.

Q501 : SAA7310 (2/3)

pin no.	mneumonic	description
QFP		
32	HFI	**High-Frequency Input:** level detector input to the data slicer. A differential signal of between 0,5 and 2,5 V (peak-to-peak value) is required to drive the data slicer correctly. When a T_{max} violation is detected or when HFD is LOW, this input is biassed directly to its threshold voltage
34	HFD	**High-Frequency Detector:** when HIGH this input signal enables the frequency and phase detector inputs, also the feedback output (FB) from the data slicer. An internal voltage clamp of 3 V (typ.) requires the HFD input to be fed via a high impedance. This input has an internal pull-up of 50 kΩ (typ.).
35	$\overline{\text{AM}}$	**Additional Mute:** This pin is normally held HIGH. Should track loss occur the pin should be taken LOW and then the data is forced LOW at the pre-FIFO stage. The muted data will then be corrected after de-interleaving. **Note** With DINT2, DEEM/$\overline{\text{DINT1}}$, FB set to logic 0 and SDAB, SCAB set to logic 1, this pin becomes the demodulator clock output (CEFM) of the SAA7210 (CD2A).
36	$\overline{\text{CRI}}$	**Counter Reset Inhibit:** when LOW this input signal allows the divide-by-588 master counter in the DEMOD timing to run-free. This input has an internal pull-up of 50 kΩ (typ.).
37	QDATA	**Q-channel Data:** this subcoding output is parity checked and changes in response to the Q-channel clock input (see subcoding microprocessor handshaking protocol).
38	QRA	**Q-channel Request input/Acknowledge output:** the output has an internal pull-up of nominally 10 kΩ. (see subcoding microprocessor handshaking protocol).
40	QCL	**Q-channel Clock:** clock input generated by the microprocessor when it detects a QRA LOW signal.
41	DEEM/$\overline{\text{DINT1}}$	**De-emphasis output and data interpolated input:** signal derived from one bit of the parity-checked Q-channel and fed out via the debounce circuit in DEEM mode. When using the CD3A in a non-digital audio application this pin should be set HIGH (with DINT2 set LOW) to prevent data being interpolated. **Note** This pin should **only** be used in its input mode when DINT2 is LOW.
42	SWAB/SSM	**Subcoding Word clock output and Start/Stop Motor input:** open drain output which is sensed during each HIGH period and if externally forced LOW a motor-stop condition will be decoded and fed to the motor control logic circuit. When allowed to return HIGH, the motor will start. This open-drain output has an internal pull-up of 10 kΩ (typ.).

Q501 : SAA7310 (3/3)

pin no.	mneumonic	description
QFP		
43	SDAB	**Subcoding Data:** a 10-bit burst of data, including flags and sync bits, is output serially once per frame clocked by burst clock output SCAB (see Fig. 6).
44	SCAB	**Subcoding Clock:** a 10-bit burst clock 2,8224 MHz (typ.) output which is used to synchronize the subcoding data.
1	EFAB	**Error Flag:** output from interpolation and mute circuit indicating unreliable data.
2	DAAB	**Data:** this output together with its clock (CLAB) and word select (WSAB) outputs, conforms to the I^2S bus format (see Fig. 7).
3	CLAB	**Clock:** I^2S output.
4	WSAB	**Word Select:** I^2S output.
5	DINT2	**Data interpolated input:** this pin should normally be set HIGH. When using the CD3A in a non-digital audio application this pin should be set LOW (with DEEM/$\overline{\text{DINT1}}$ set HIGH) to prevent data being interpolated.
6	TEST1	**Test output 1**
17	TEST2	**Test output 2**
33	TEST3	**Test output 3**
39	TEST4	**Test output 4**

Note to the pin functions

The pin sequence of the address outputs (A0 - A7) and the data outputs (D1 - D4) has been selected to be compatible with various dynamic 16 K x 4-bit RAMs including the 4416.

Q504 : PCF3523P

pin no.	mnemonic	i/o	description
1	WSAB	I	Word Select: I2S input.
2	CLAB	I	Clock: I2S input.
3	DAAB	I	Data: I2S input.
4	EFAB	I	Error Flag: Indicating unreliable data when high. Copied to the validity bit in the DOBM output signal.
5	FS44	I	Sampling Frequency in channel status block: 44.1 KHz when this input is HIGH, 32 KHz when LOW. This input has an internal pull-up.
6	SCAB	I	Subcode Clock: 10 bit burst clock which synchronizes subcode data. Alternative function: control bit 2 of channel status block.
7	SDAB	I	Subcode Data: 10 bit burst data. Alternative function: control bit 3 of channel status.
8	VSS		Ground: circuit earth potential.
9	XIN	I	Crystal oscillator input from crystal oscillator or slave clock.
10	XOUT	O	Crystal clock drive output to clock crystal.
11	XSYS	O	System clock output: 256 x Fs.
12	TESTB	I	Test input: HIGH for normal operation. This input has an internal pull-up.
13	DOBM	O	Digital Audio Output: biphase modulated signal.
14	DOEN	I	Digital Output ENable: disables DOBM (continuously LOW) when LOW (standby). This input has an internal pull-up.
15	ATSB	I	Attenuation: when active LOW this control input provides -12 dB attenuation. This input has an internal pull-up.
16	VDD		Power supply: positive supply voltage (+5V).

Q563 : SM5803AP

PIN No.	NAME	I/O *1	DESCRIPTION
1	DIN	Ip	Serial data input
2	BCKI	Ip	Timing clock for serial input data (Bit clock)
3	$\overline{\text{CKSL}}$	Ip	Selecting system clock *2
4	$\overline{\text{CKDV}}$	Ip	↑
5	$\overline{\text{8X}}$	Ip	Selecting over sampling H: 4fs L: 8fs
6	XTI	I	Input for oscillator or external clock input (System clock)
7	XTO	O	Output for oscillator, No connect when using external clock
8	V_{SS1}	—	Ground 1
9	CKO	O	Clock output (Same frequency as XT1 input clock)
10	MS1	Ip	Mode set control 1
11	MS2	Ip	Mode set control 2
12	MS3	Ip	Mode set control 3
13	MDT	Ip	Mode set data
14	$\overline{\text{MEN}}$	Ip	Mode set enable
15	MUTE	Ip	Mute control H: Mute on L: Mute off
16	DIEM	Ip	Digital de-emphasis control H: De-emphasis on L: De-emphasis off
17	FSEL1	Ip	Selecting digital de-emphasis filter characteristics *3
18	FSEL2	Ip	↑
19	DGR	O	8fs dual output mode: Deglitch signal (Negative output) 4fs dual output mode: ↑ 4fs alternate output mode: Deglitch signal (Rch)
20	DGL	O	8fs dual output mode: Deglitch signal (Positive output) 4fs dual output mode: ↑ 4fs alternate output mode: Deglitch signal (Lch)
21	V_{SS2}	—	Ground 2
22	V_{DD}	—	Supply voltage (+5V)
23	DOR	O	8fs dual output mode: Rch data output 4fs dual output mode: ↑ 4fs alternate output mode: Multiplex clock for L/R output data
24	DOL	O	8fs dual output mode: Lch data output 4fs dual output mode: ↑ 4fs alternate output mode: Lch/Rch data output
25	WCKO	O	Output timing control (Word clock)
26	BCKO	O	Output timing control for serial data (Bit clock)
27	FSCO	O	Internal timing clock (fs rate)
28	LRCI	Ip	Multiplex clock for Lch/Rch input data (fs rate) H: Lch L: Rch

*1) I : Input terminal
Ip : Input terminal with pull-up resistance
O : Output terminal

*2)

$\overline{\text{CKSL}}$	$\overline{\text{CKDV}}$	System clock (Input to XTI)
H	H	192fs
H	L	384fs
L	H	256fs
L	L	512fs

*3)

FSEL1	FSEL2	Characteristics of de-emphasis
H	H	fs = 32 kHz
L	L	fs = 44.1 kHz
L	H	fs = 48 kHz

QD01, QD02 : TDA1547

PIN NO.	NAME	DESCRIPTION
1	diggnd	0V digital supply
2	vdddig	5V digital supply for both channels
3	datchr	serial one-bit data input for the right channel
4	n.c.	pin not connected, should preferably be connected to digital ground
5	clkinr	clock input for the right channel
6	vdddigr	5V digital supply for the right channel. This voltage determines the internal logic high level in the right channel.
7	vssdigr	−3.5V digital supply for the right channel. This voltage determines the internal logic low level in the right channel.
8	vrefr	−4V reference voltage for the right channel switch capacitor DAC.
9	agnddacr	0V reference voltage for the right channel switch capacitor DAC. This pin should be connected to analog ground.
10	outdnr	output from the right negative switch capacitor DAC. Feedback connection for the right negative opamp
11	outdr	output from the right positive switch capacitor DAC. Feedback connection for the right positive opamp.
12	agndopar	0V reference voltage for both right channel opamps.
13	n.c.	pin not connected, should preferably be connected to analog ground.
14	outopar	output of right positive opamp
15	outnopar	output of right negative opamp.
16	vssanl	−5V analog supply
17	vddanl	5V analog supply
18	outnopal	output of left negative opamp.
19	outopal	output of left positive opamp.
20	n.c.	pin not connected, should preferably be connected to analog ground.
21	agndopal	0V reference voltage for both left channel opamps
22	outdl	output from the left positive switch capacitor DAC. Feedback connection for the left positive opamp.
23	outdnl	output from the left negative switch capacitor DAC. Feedback connection for the left negative opamp
24	agnddacl	0V reference voltage for the left channel switch capacitor DAC. This pin snould be connected to analog ground.
25	vrefl	−4V reference voltage for the left channel switch capacitor DAC.
26	vssdigl	−3.5V digital supply for the left channel. This voltage determines the internal logic low level in the left channel
27	vdddigl	5V digital supply for the left channel. This voltage determines the internal logic high level in the left channel.
28	clkinr	clock input for the left channel
29	n.c.	pin not connected, should preferably be connected to digital ground
30	datchl	serial one-bit data input for the right channel
31	vssdig	−5V digital supply for both channels
32	sub	−5V substrate

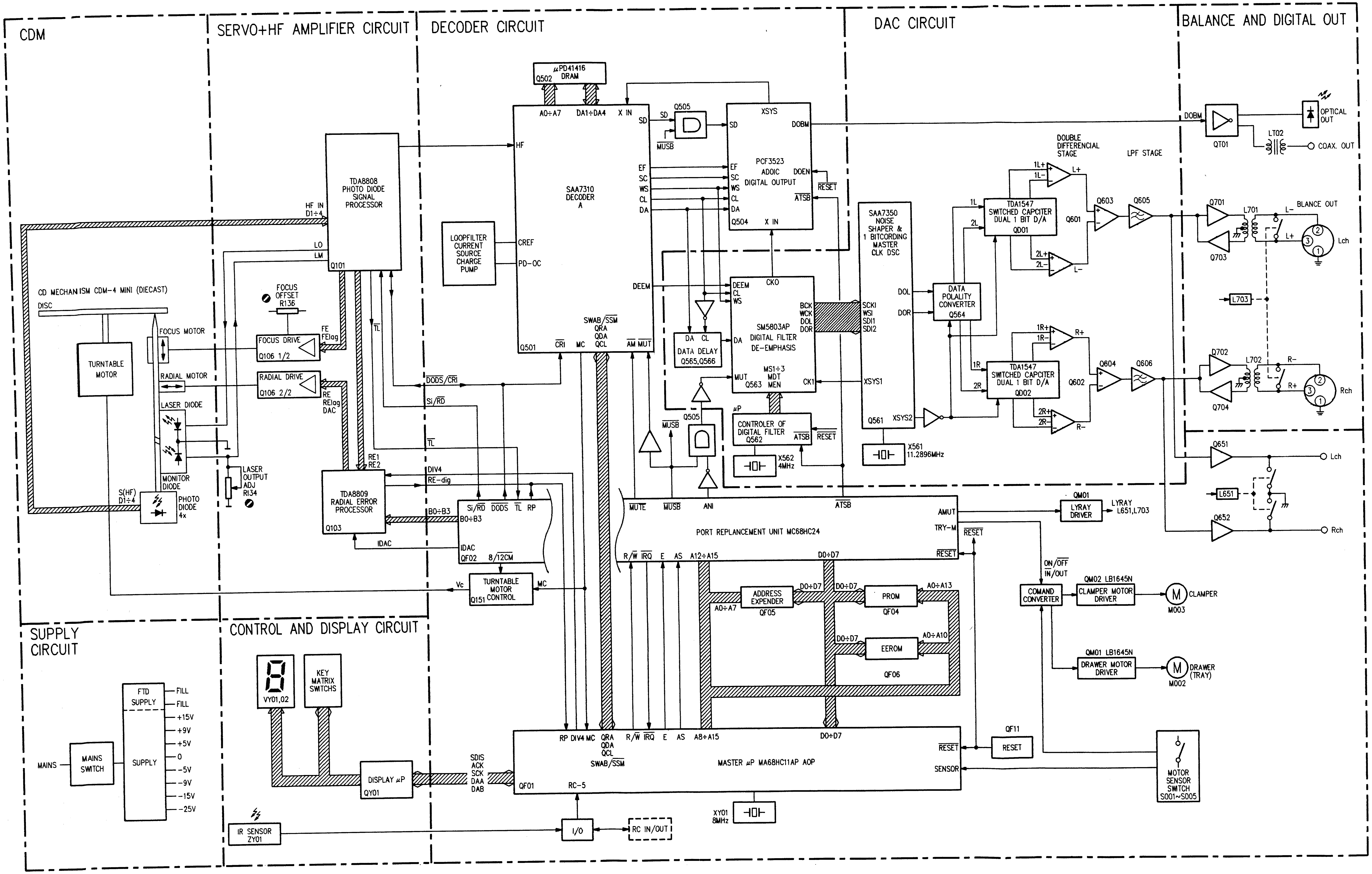
Q561 : SAA7350GP (1/2)

Pin No.	mnemonic	description
1	XSEL	Crystal frequency select. This pin is used to select the master crystal frequency as follows:– XSEL HIGH = 384fs XSEL LOW = 256fs This pin defaults to XSEL HIGH when not connected.
2	$\overline{\text{DOEN}}$	One–bit Digital Output Enable. When LOW, the one–bit code outputs are made available for TDA1547 (DAC7). If unconnected the pin will default HIGH.
3	IDF3	Input data format. These three pins determine the input format the device is to operate in (see functional description). If unconnected these pins will default HIGH (i.e. burst clock mode).
4	IDF2	
5	IDF1	
6	TEST4	Test 4: This pin should be left open circuit.
7	SDI2	Serial Data Input. Used in simultaneous mode only (for the right channel signal). When not used, this pin will be internally pulled high.
8	SDI1	Serial Data Input. This should be a 16, 18 or 20–bit linear 2's complement PCM signal. In simultaneous mode this pin is used for the left channel signal.
9	WSI	Serial input Word Select signal. Signifies whether data word is for the left or right channel. Can be either fs, 2fs, 4fs or 8fs where fs is the system sampling frequency. fs can lie between 16kHz and 53kHz.
10	SCKI	Bit clock input for the serial input interface.
11	TEST1	Test 1. This pin should be left open circuit.
12	VDD	+5V power supply for the digital section.
13	VSS	Ground connection for the digital section.
14	XIN	Crystal Oscillator Input.
15	XOUT	Crystal Oscillator Output.
16	XSYS1	Buffered Oscillator Output.
17	TEST5	Test 5. In normal operation this pin should be tied LOW.
18	VDDAR	Analogue 5V supply for right channel.
19	INTR+	Output from the Right Positive switched–capacitor integrator. Input to differential op–amp.
20	FBR+	Feedback connection for the Right positive switched–capacitor integrator.
21	VSSAR	0V supply for right channel.
22	FBR–	Feedback connection for the Right Negative switched–capacitor integrator.
23	INTR–	Output from the Right Negative switched–capacitor integrator. Input to differential op–amp.
24	VRCR	High impedance voltage reference for right channel inputs. Typically VDDAR/2.

Q561 : SAA7350GP (2/2)

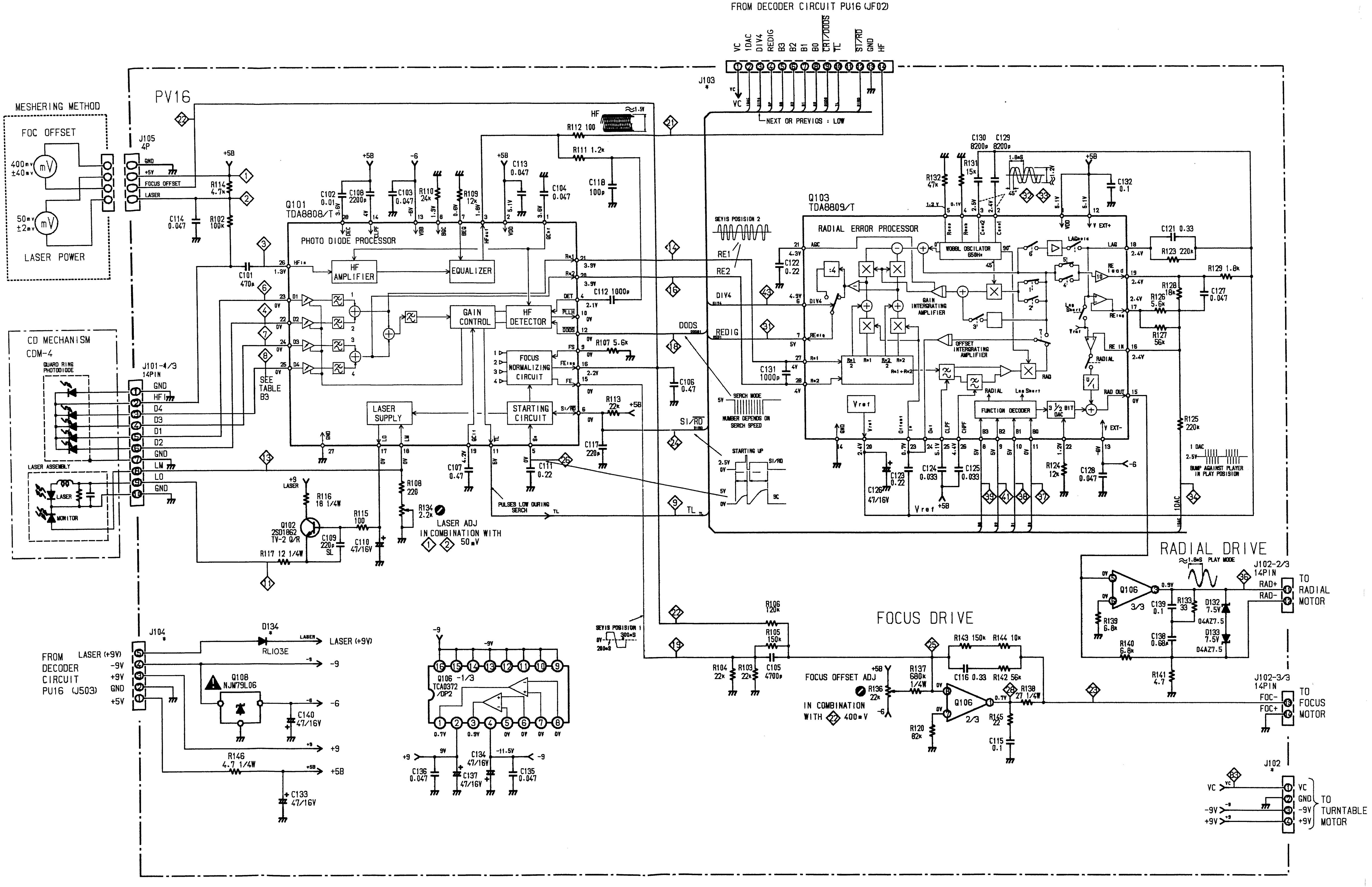
Pin No.	mnemonic	description
25	VDACR	Reference Voltage Supply for Right channel DAC's. Normally this will be connected to VSS.
26	VROR	Right channel Voltage Reference Output. Typically VDDAR/2.
27	VDDATR	5V supply for right channel analogue timing.
28	VSSAT	0V supply for left and right channel analogue.
29	VDDATL	5V supply for left channel analogue timing.
30	IRR	24kohm bias resistor connection for the reference current generator circuit.
31	VROL	Left channel Voltage Reference Output. Typically VDDAL/2.
32	VDACL	Reference Voltage Supply for Left channel DAC. Normally this will be connected to VSS.
33	VRCL	High impedance voltage reference for left channel inputs and for bias current generator. Typically VDDAL/2.
34	INTL–	Output from the Left Negative switched–capacitor integrator. Input to differential op–amp.
35	FBL–	Feedback connection for the Left Negative switched–capacitor integrator.
36	VSSAL	Ov supply for left channel.
37	FBL+	Feedback connection for the Left Positive switched–capacitor integrator.
38	INTL+	Output from the Left Positive switched–capacitor integrator. Input to differential op–amp.
39	VDDAL	Analogue 5V supply for left channel.
40	TEST2	Test 2: This pin should be left open circuit.
41	TEST3	Test 3: This pin should be left open circuit.
42	DOL	Digital Output Left. Left channel one–bit code for TDA1547 (DAC7). when disabled this pin will be driven LOW.
43	XSYS2	Output clock at a frequency of half the master clock frequency.
44	DOR	Digital Output Right. Right channel one–bit code for TDA1547 (DAC7). When disabled this pin will be driven LOW.

4 BLOCK DIAGRAM


CDM
SERVO+HF AMPLIFIER CIRCUIT
DECODER CIRCUIT
DAC CIRCUIT
BALANCE AND DIGITAL OUT
SUPPLY CIRCUIT
CONTROL AND DISPLAY CIRCUIT
CD MECHANISM CDM-4 MINI (DIECAST)
DISC
TURNTABLE MOTOR
FOCUS MOTOR
RADIAL MOTOR
LASER DIODE
MONITOR DIODE
PHOTO DIODE 4x
S(HF) D1÷4
TDA8808 PHOTO DIODE SIGNAL PROCESSOR
Q101
HF IN D1÷4
LO
LM
FOCUS OFFSET R136
FOCUS DRIVE Q106 1/2
RADIAL DRIVE Q106 2/2
FE
FElag
RE
RElag
DAC
TL
LASER OUTPUT ADJ R134
TDA8809 RADIAL ERROR PROCESSOR
Q103
RE1
RE2
IDAC
µPD41416 DRAM
Q502
A0÷A7
DA1÷DA4
X IN
HF
SAA7310 DECODER A
LOOPFILTER CURRENT SOURCE CHARGE PUMP
CREF
PD-OC
EF
SC
WS
CL
DA
SD
DEEM
SWAB/SSM
QRA
QDA
QCL
Q501
CRI
MC
AM
MUT
DODS/CRI
Si/RD
DIV4
RE-dig
B0÷B3
Q505
MUSB
XSYS
DOBM
PCF3523 ADOIC DIGITAL OUTPUT
DOEN
RESET
ATSB
Q504
CKO
SM5803AP DIGITAL FILTER DE-EMPHASIS
BCK
WCK
DOL
DOR
MS1÷3
MDT
MEN
CK1
Q563
DA CL DATA DELAY Q565,Q566
µP CONTROLER OF DIGITAL FILTER Q562
X562 4MHz
SAA7350 NOISE SHAPER & 1 BITCORDING MASTER CLK DSC
SCKI
WSI
SDI1
SDI2
XSYS1
XSYS2
Q561
X561 11.2896MHz
DATA POLALITY CONVERTER Q564
DOUBLE DIFFERENCIAL STAGE
LPF STAGE
TDA1547 SWITCHED CAPCITER DUAL 1 BIT D/A QD01
TDA1547 SWITCHED CAPCITER DUAL 1 BIT D/A QD02
1L
2L
1R
2R
1L+
1L-
2L+
2L-
1R+
1R-
2R+
2R-
L+
L-
R+
R-
Q601
Q602
Q603
Q604
Q605
Q606
QT01
OPTICAL OUT
LT02
COAX. OUT
Q701
Q703
L701
BLANCE OUT
Lch
Q702
Q704
L702
Rch
L703
Q651
Q652
L651
QM01 LYRAY DRIVER
LYRAY L651,L703
Si/RD DODS TL RP
QF02 8/12CM
TURNTABLE MOTOR CONTROL Q151
Vc
MUTE
MUSB
ANI
PORT REPLANCEMENT UNIT MC68HC24
AMUT
TRY-M
R/W IRQ E AS A12÷A15
D0÷D7
ADDRESS EXPENDER QF05
PROM QF04
EEROM QF06
A0÷A13
A0÷A10
ON/OFF IN/OUT
COMAND CONVERTER
QM02 LB1645N CLAMPER MOTOR DRIVER
CLAMPER M003
QM01 LB1645N DRAWER MOTOR DRIVER
DRAWER (TRAY) M002
QF11 RESET
MOTOR SENSOR SWITCH S001~S005
RP DIV4 MC
A8÷A15
MASTER µP MA68HC11AP AOP
SENSOR
QF01
RC-5
XY01 8MHz
I/O
RC IN/OUT
SDIS ACK SCK DAA DAB
DISPLAY µP QY01
VY01,02
KEY MATRIX SWITCHS
IR SENSOR ZY01
FTD SUPPLY
SUPPLY
MAINS
MAINS SWITCH
FILL
FILL
+15V
+9V
+5V
0
-5V
-9V
-15V
-25V

NOTE: For the description of each signal, refer to the IC description of IC PIN FUNCTIONS Section.

5 SCHEMATIC DIAGRAM AND PARTS LOCATIONS (PATTERN SIDE)

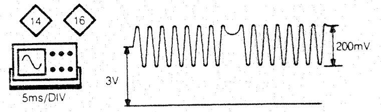

FROM DECODER CIRCUIT PU16 (JF02)
VC
1DAC
DIV4
REDIG
B3
B2
B1
B0
CRT/DODS
TL
SI/RD
GND
HF
J103
NEXT OR PREVIOS : LOW
PV16
MESHERING METHOD
FOC OFFSET
400mV ±40mV
mV
50mV ±2mV
mV
LASER POWER
J105 4P
GND
+5V
FOCUS OFFSET
LASER
+5B
R114 4.7k
C114 0.047
R102 100k
C101 470p
Q101 TDA8808/T
PHOTO DIODE PROCESSOR
HF AMPLIFIER
EQUALIZER
GAIN CONTROL
HF DETECTOR
FOCUS NORMALIZING CIRCUIT
STARTING CIRCUIT
LASER SUPPLY
SEE TABLE B3
C102 0.01
C108 2200p
C103 0.047
R110 24k
R109 12k
C113 0.047
C104 0.047
C118 100p
R112 100
R111 1.2k
HF
C112 1000p
R107 5.6k
R113 22k
C106 0.47
C117 220p
C107 0.47
C111 0.22
PULSES LOW DURING SERCH
TL
CD MECHANISM
CDM-4
GUARD RING PHOTODIODE
J101-4/3 14PIN
GND
HF
D4
D3
D1
D2
GND
LM
LO
GND
LASER ASSEMBLY
LASER
MONITOR
+9 LASER
R116 18 1/4W
Q102 2SD1862 TV-2 Q/R
R115 100
C109 220p SL
C110 47/16V
R117 12 1/4W
R108 220
R134 2.2k
LASER ADJ IN COMBINATION WITH 50mV
Q103 TDA8809/T
RADIAL ERROR PROCESSOR
WOBBL OSCILATOR 650Hz
GAIN INTERGRATING AMPLIFIER
OFFSET INTERGRATING AMPLIFIER
FUNCTION DECODER
3 1/2 BIT DAC
Vref
RADIAL
LAG
RE lead
RE IN
RAD OUT
SEYIS POSISION 2
RE1
RE2
DIV4
DODS
REDIG
SI/RD
SERCH MODE
NUMBER DEPENDS ON SERCH SPEED
STARTING UP
C130 8200p
C129 8200p
R132 47k
R131 15k
C132 0.1
C121 0.33
R123 220k
R129 1.8k
R128 18k
C127 0.047
R126 5.6k
R127 56k
R125 220k
C122 0.22
C131 1000p
C126 47/16V
C123 0.22
C124 0.033
C125 0.033
R124 12k
C128 0.047
1 DAC
BUMP AGAINST PLAYER IN PLAY POSISION
RADIAL DRIVE
1.8mS PLAY MODE
J102-2/3 14PIN
RAD+
RAD-
TO RADIAL MOTOR
Q106 3/3
R133 33
C139 0.1
D132 7.5V 04AZ7.5
D133 7.5V 04AZ7.5
R139 6.8k
R140 6.8k
C138 0.68
R141 4.7
FOCUS DRIVE
SEYIS POSISION 1
R106 120k
R105 150k
R104 22k
R103 22k
C105 4700p
R143 150k
R144 10k
C116 0.33
R142 56k
FOCUS OFFSET ADJ
R137 680k 1/4W
R136 22k
IN COMBINATION WITH 400mV
Q106 2/3
R138 27 1/4W
R145 22
R120 82k
C115 0.1
J102-3/3 14PIN
FOC-
FOC+
TO FOCUS MOTOR
J102
VC
GND
-9V
+9V
TO TURNTABLE MOTOR
J104
FROM DECODER CIRCUIT PU16 (J503)
LASER (+9V)
-9V
+9V
GND
+5V
D134 RLI03E
LASER (+9V)
Q108 NJM79L06
C140 47/16V
R146 4.7 1/4W
C133 47/16V
-9
-6
+9
+5B
Q106 -1/3 TCA0372 /DP2
C134 47/16V
C137 47/16V
C136 0.047
C135 0.047

1 2 ADJUST
50mV DC
SEE ALSO TABLE

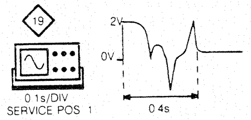
4 6 7 8 SEE TABLE

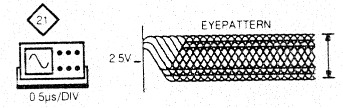
9 LOW PULSES DURING SEARCH

11 13 SAEE TABLE

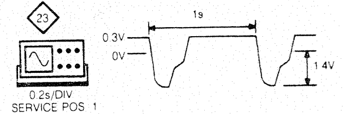


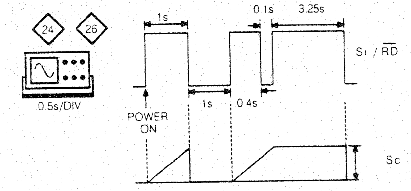
18 LOW PULSES DURING ⟨TRACK AND TRACK ⟩

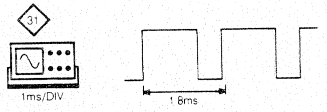


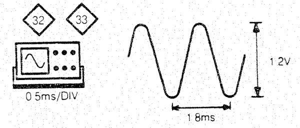


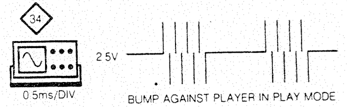
22 ADJUST
400mV DC
SEE ALSO TABLE







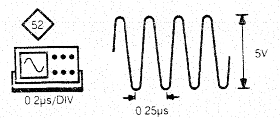




BUMP AGAINST PLAYER IN PLAY MODE

37 38 39 41

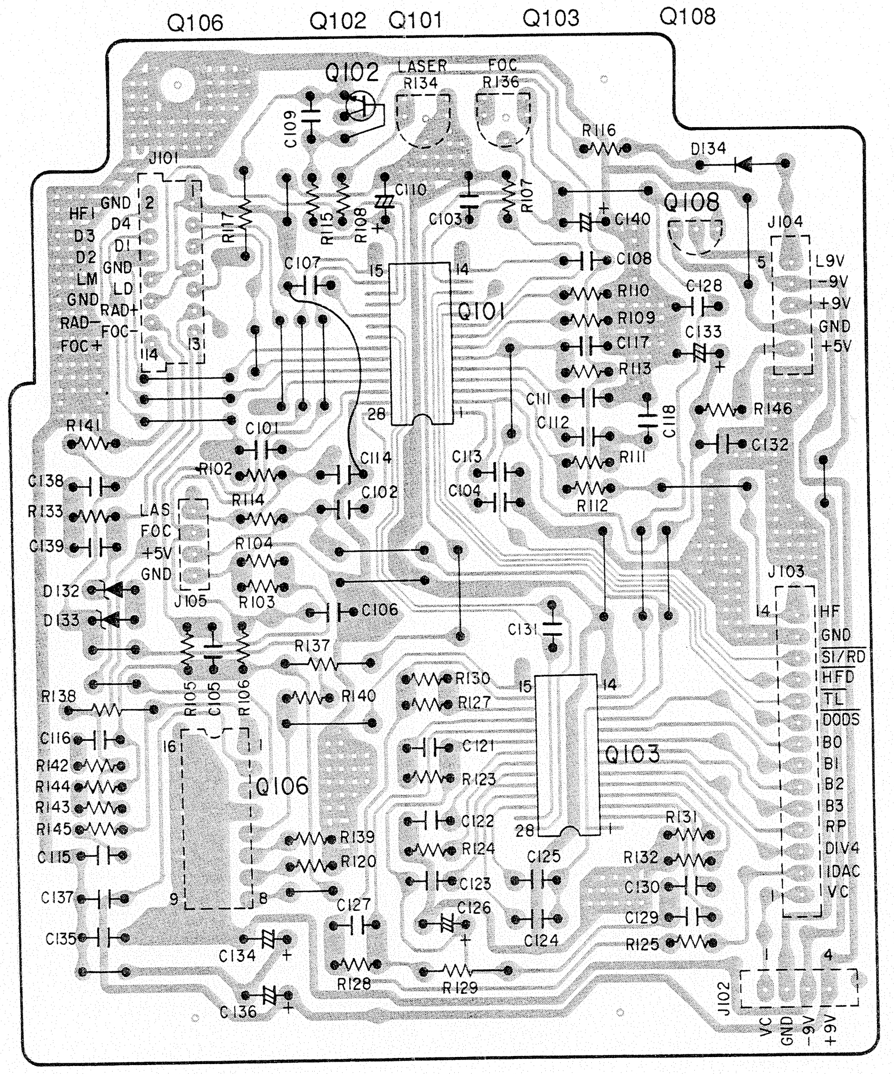
	SERVICE POSITION 0		PLAY MODE
	‹‹ SEARCH	››	SEARCH
B3	HIGH	HIGH	ACTIVITY
B2	HIGH	LOW	ACTIVITY
B1	HIGH	HIGH	ACTIVITY
B0	LOW	LOW	ACTIVITY

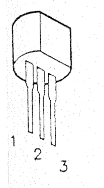


82 0 V FOR 12 cm DISC
5 V FOR 8 cm DISC

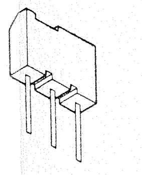
83 -1 V AT BEGINNING OF DISC
-0.6 V AT END OF DISC

PV16 SERVO

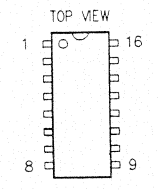

Q106
Q102
Q101
Q103
Q108
LASER
R134
FOC
R136
J101
HFI
D3
D2
LM
GND
RAD-
FOC+
GND
D4
D1
GND
LD
RAD+
FOC-
J104
L9V
-9V
+9V
GND
+5V
J105
LAS
FOC
+5V
GND
J103
HF
GND
SI/RD
HFD
TL
DODS
B0
B1
B2
B3
RP
DIV4
IDAC
VC
J102
VC
GND
-9V
+9V
D134
D132
D133



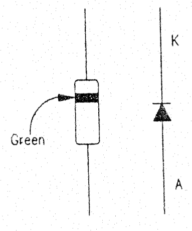
NJM79L06



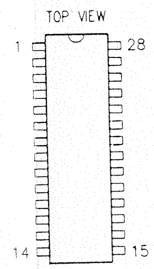
2SD1862Q,R


TOP VIEW
1
16
8
9

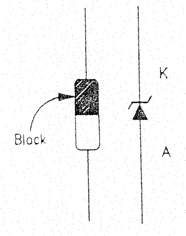
TCA0372



1SS176

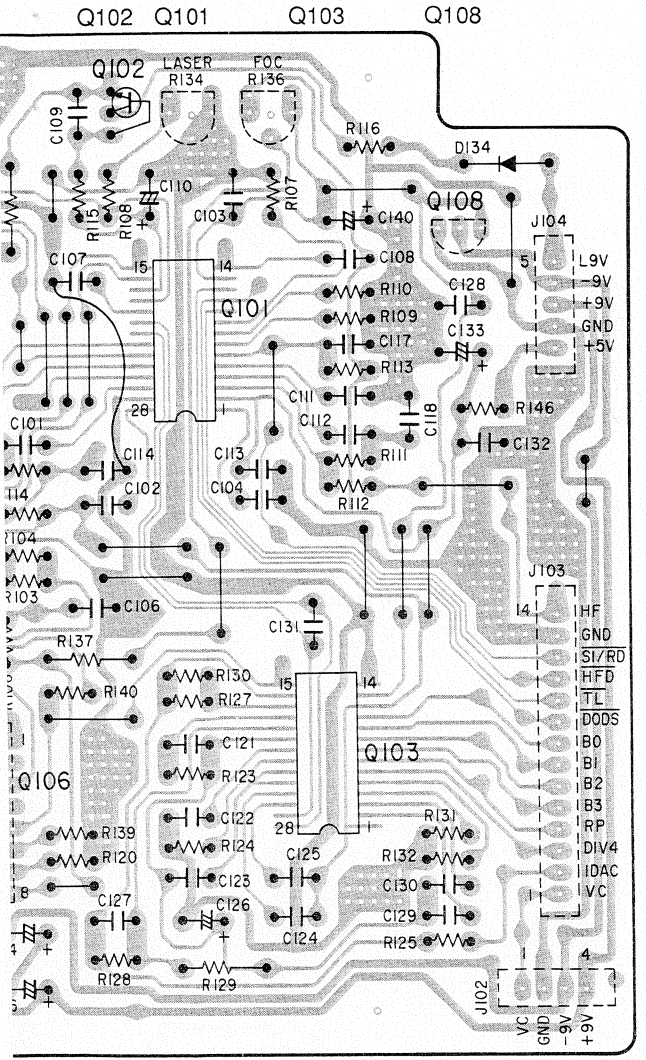

TOP VIEW
1
28
14
15

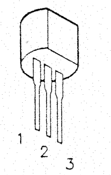
TDA8808
TDA8809



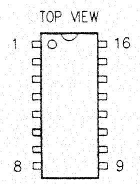
04AZ7.5

RVO

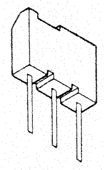

Q102
Q101
Q103
Q108
LASER R134
FOC R136
R116
D134
Q108
J104
L9V
-9V
+9V
GND
+5V
Q101
C140
C108
R110
R109
C117
R113
C128
C133
C118
R146
C132
C101
C114
C102
C113
C104
C111
C112
R111
R112
C106
C131
J103
HF
GND
SI/RD
HFD
TL
DODS
B0
B1
B2
B3
RP
DIV4
IDAC
VC
R137
R140
R130
R127
C121
R123
Q103
Q106
C122
R124
R131
R139
R120
C125
R132
C130
C123
C126
C127
C129
C124
R125
R128
R129
J102
VC
GND
-9V
+9V



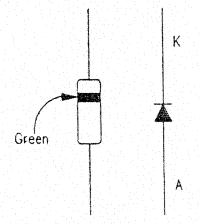
NJM79L06


TOP VIEW
1
16
8
9

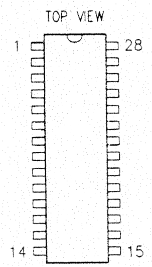
TCA0372



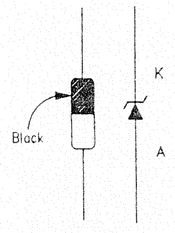
2SD1862Q,R



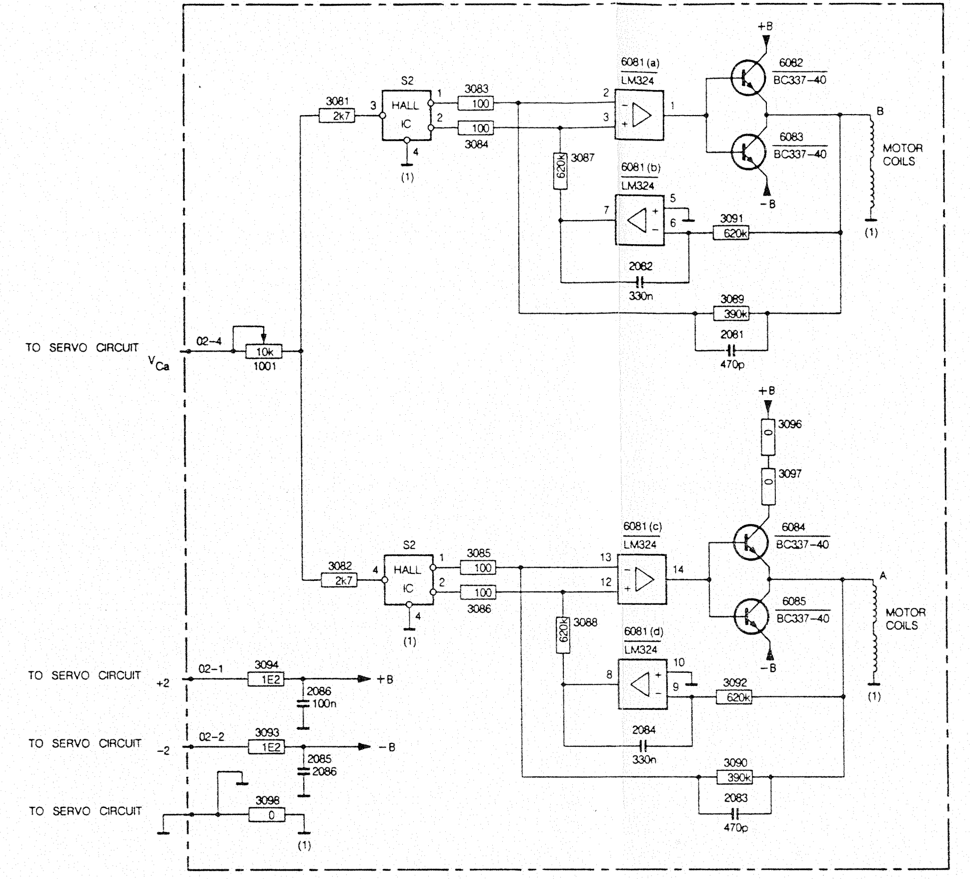
1SS176

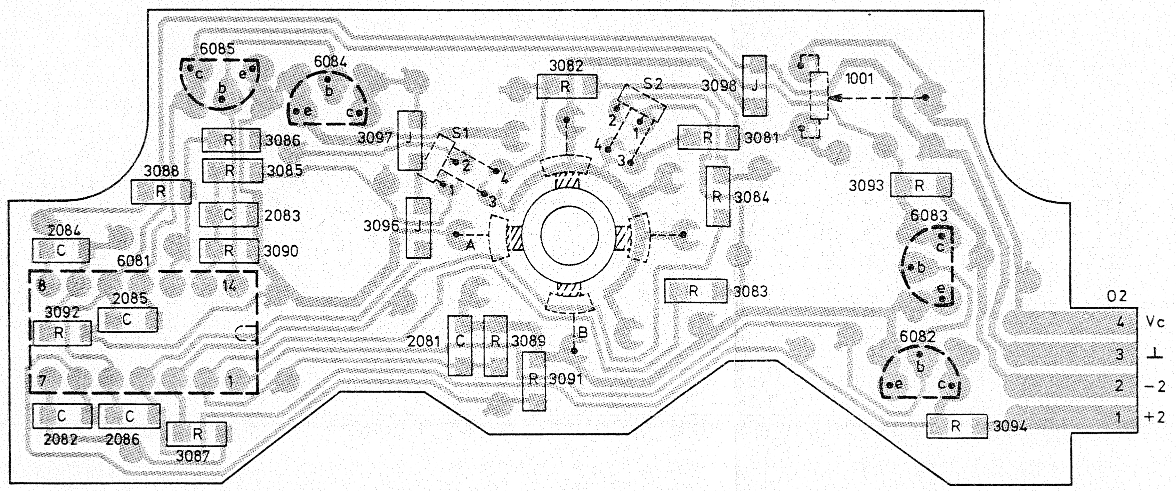

TOP VIEW
1
28
14
15

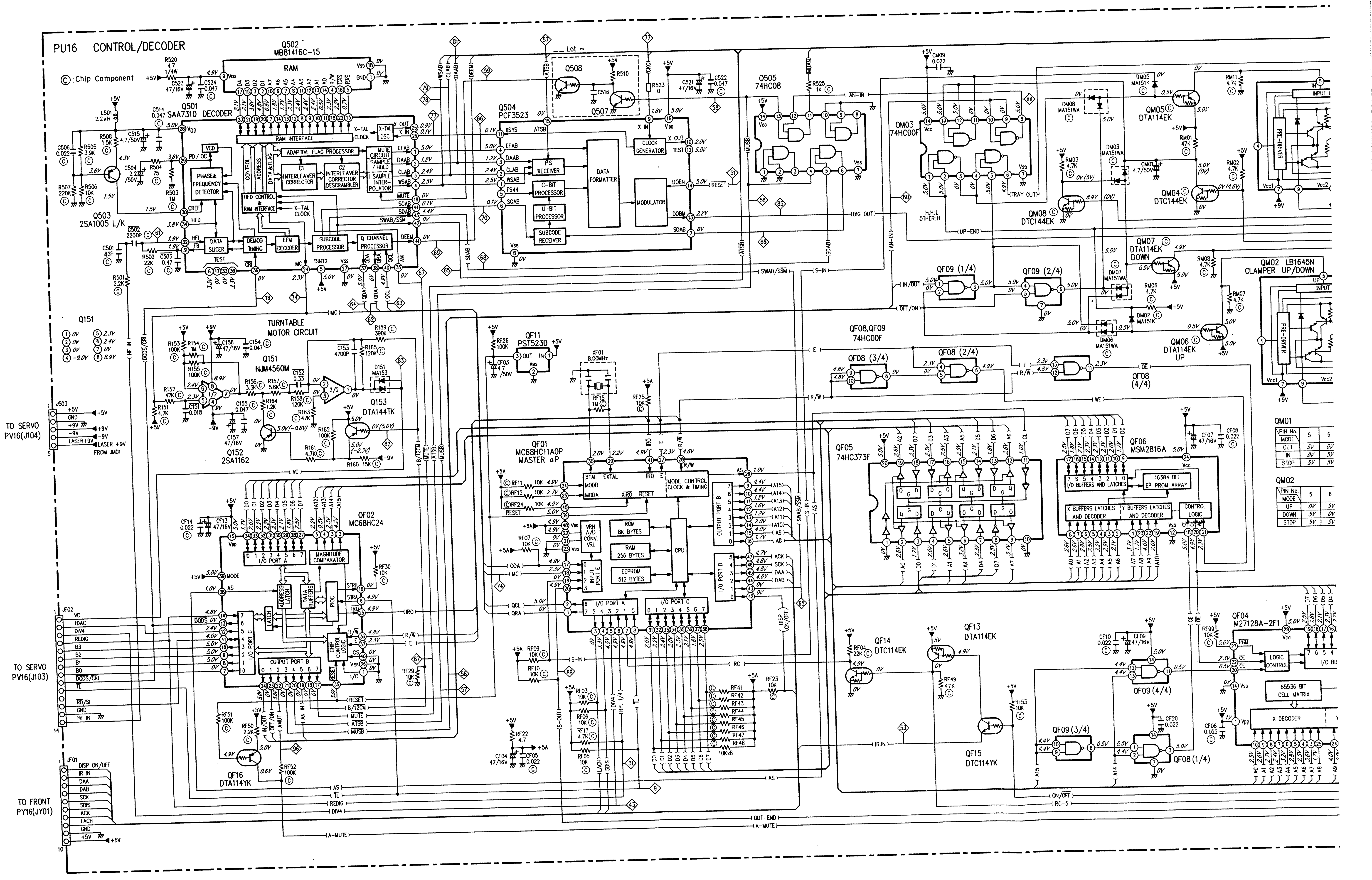
TDA8808
TDA8809



04AZ7.5


MOTOR CIRCUIT
TO SERVO CIRCUIT
Vca
02-4
10k
1001
3081
2k7
S2
HALL IC
3083
100
3084
100
6081 (a)
LM324
6082
BC337-40
6083
BC337-40
+B
-B
B
MOTOR COILS
3087
6081 (b)
LM324
3091
620k
2082
330n
3089
390k
2081
470p
3096
3097
3082
2k7
3085
100
3086
100
6081 (c)
LM324
6084
BC337-40
6085
BC337-40
A
MOTOR COILS
3088
6081 (d)
LM324
3092
620k
2084
330n
3090
390k
2083
470p
TO SERVO CIRCUIT +2
02-1
3094
1E2
2086
100n
TO SERVO CIRCUIT -2
02-2
3093
1E2
2085
TO SERVO CIRCUIT
3098
0
(1)


6085
6084
3082
S2
3098
1001
3086
3097
S1
3081
3088
3085
3084
3093
2084
2083
3096
6083
3090
6081
3083
3092
2085
14
2081
3089
02
Vc
-2
+2
7
1
6082
3091
2082
2086
3087
3094

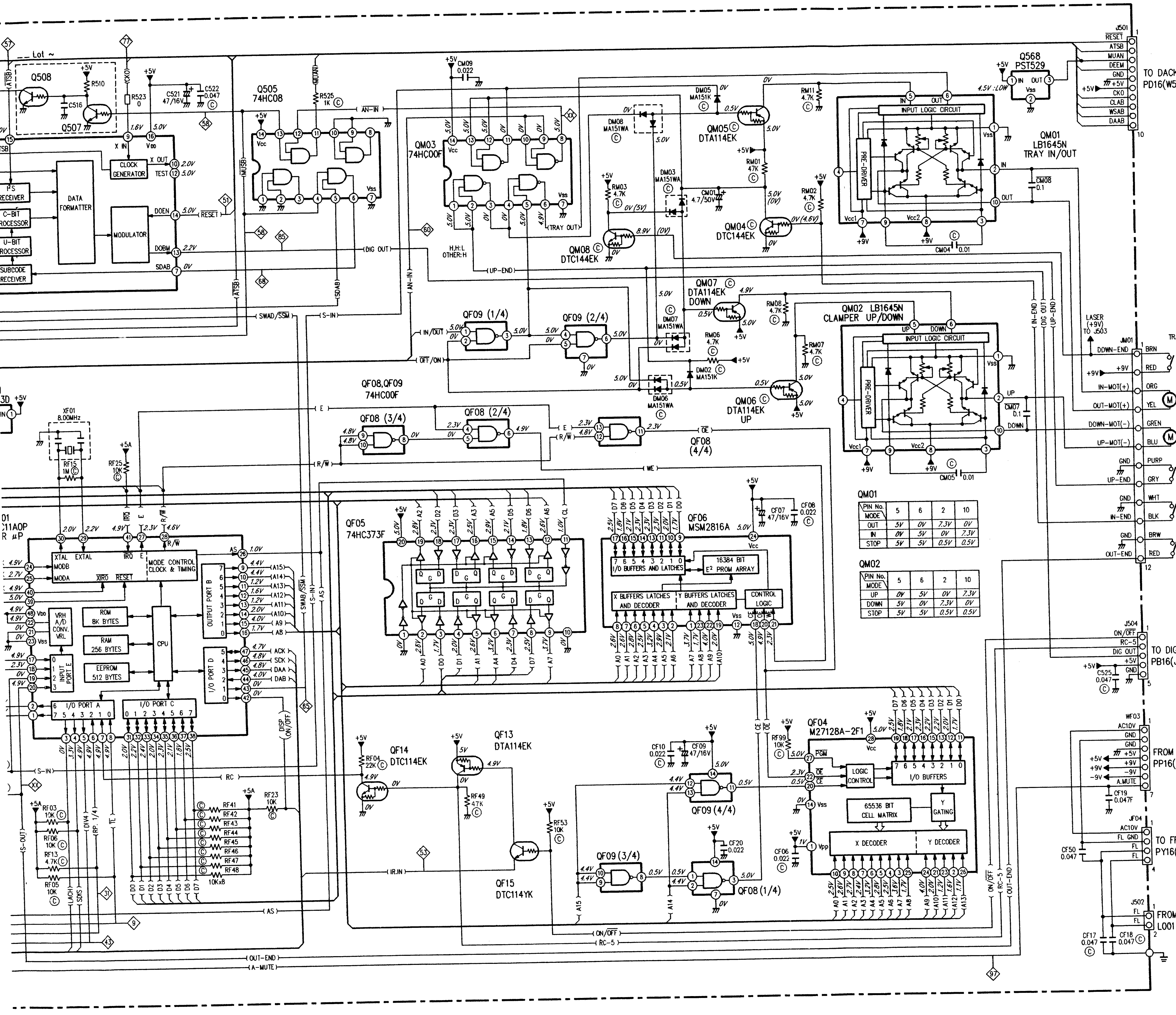

PU16 CONTROL/DECODER
Ⓒ:Chip Component
Q502 MB81416C-15
RAM
Q501 SAA7310 DECODER
RAM INTERFACE
ADAPTIVE FLAG PROCESSOR
C1 INTERLEAVER CORRECTOR
C2 INTERLEAVER CORRECTOR DESCRAMBLER
MUTE CIRCUIT SAMPLE / HOLD I SAMPLE INTER-POLATOR
X-TAL OSC.
VCO
PHASE& FREQUENCY DETECTOR
FIFO CONTROL & RAM INTERFACE
X-TAL CLOCK
DATA SLICER
DEMOD TIMING
EFM DECODER
SUBCODE PROCESSOR
Q CHANNEL PROCESSOR
TEST
Q503 2SA1005 L/K
Q504 PCF3523
I²S RECEIVER
C-BIT PROCESSOR
U-BIT PROCESSOR
SUBCODE RECEIVER
DATA FORMATTER
CLOCK GENERATOR
MODULATOR
Q508
Q507
Lot ~
Q505 74HC08
QM03 74HC00F
TRAY OUT
UP-END
DIG OUT
RESET
H,H:L OTHER:H
DM08 MA151WA
DM03 MA151WA
DM05 MA151K
QM05 DTA114EK
QM04 DTC144EK
QM08 DTC144EK
QM07 DTA114EK DOWN
QM06 DTA114EK UP
DM07 MA151WA
DM06 MA151WA
DM02 MA151K
QM02 LB1645N CLAMPER UP/DOWN
PRE-DRIVER
INPUT
Vcc1
Vcc2
QF09 (1/4)
QF09 (2/4)
QF08,QF09 74HC00F
QF08 (3/4)
QF08 (2/4)
QF08 (4/4)
IN/OUT
OFF/ON
Q151
TURNTABLE MOTOR CIRCUIT
Q151 NJM4560M
D151 MA153
Q153 DTA144TK
Q152 2SA1162
QF11 PST523D
XF01 8.00MHz
QF01 MC68HC11A0P MASTER μP
XTAL EXTAL IRQ E
MODE CONTROL CLOCK & TIMING
ROM 8K BYTES
RAM 256 BYTES
EEPROM 512 BYTES
CPU
VRH A/D CONV. VRL
INPUT PORT E
OUTPUT PORT B
INPUT PORT D
I/O PORT A
I/O PORT C
QF02 MC68HC24
I/O PORT A
MAGNITUDE COMPARATOR
ADDRESS LATCH
DATA BUFFERS
PIOC
LATCH
I/O PORT C
OUTPUT PORT B
CHIP CONTROL LOGIC
QF05 74HC373F
QF06 MSM2816A
I/O BUFFERS AND LATCHES
16384 BIT E² PROM ARRAY
X BUFFERS LATCHES AND DECODER
Y BUFFERS LATCHES AND DECODER
CONTROL LOGIC
QF04 M27128A-2F1
LOGIC CONTROL
65536 BIT CELL MATRIX
X DECODER
QF14 DTC114EK
QF13 DTA114EK
QF15 DTC114YK
QF16 DTA114YK
QF09 (4/4)
QF09 (3/4)
QF08 (1/4)
TO SERVO PV16(J104)
J503
LASER +9V FROM JM01
TO SERVO PV16(J103)
JF02
VC 1DAC DIV4 REDIG B3 B2 B1 B0 DODS/CRI TL RD/SI GND HF IN
TO FRONT PY16(JY01)
JF01
DISP ON/OFF IR IN DAA DAB SCK SDIS ACK LACH GND +5V
A-MUTE
OUT-END
ON/OFF
RC-5

QM01

PIN No. / MODE	5	6
OUT	5V	0V
IN	0V	5V
STOP	5V	5V

QM02

PIN No. / MODE	5	6
UP	0V	5V
DOWN	5V	0V
STOP	5V	5V


Q508
Q507
Q505 74HC08
QM03 74HC00F
QM05 DTA114EK
QM04 DTC144EK
QM08 DTC144EK
QM07 DTA114EK DOWN
QM06 DTA114EK UP
Q568 PST529
QM01 LB1645N TRAY IN/OUT
QM02 LB1645N CLAMPER UP/DOWN
INPUT LOGIC CIRCUIT
PRE-DRIVER
QF09 (1/4)
QF09 (2/4)
QF08,QF09 74HC00F
QF08 (3/4)
QF08 (2/4)
QF08 (4/4)
QF05 74HC373F
QF06 MSM2816A
16384 BIT E² PROM ARRAY
QF04 M27128A-2F1
65536 BIT CELL MATRIX
QF14 DTC114EK
QF13 DTA114EK
QF15 DTC114YK
QF09 (4/4)
QF09 (3/4)
QF08 (1/4)
CLOCK GENERATOR
DATA FORMATTER
MODULATOR
XF01 8.00MHz
ROM 8K BYTES
RAM 256 BYTES
EEPROM 512 BYTES
CPU
J501
TO DACK PD16(W501)
TRAY SENSOR SW
S003 DOWN-END SW
M002 DRWER-DRIVER MOTOR
M003 CLAMPER-DRIVER MOTOR
S004 UP-END SW
S001 IN-END SW
S002 OUT-END SW
J504
TO DIGITAL PB16(JT01)
WF03
FROM POWER PP16(J803)
JF04
TO FRONT PY16(JY02)
J502
FROM TRANSFORMER L001

QM01

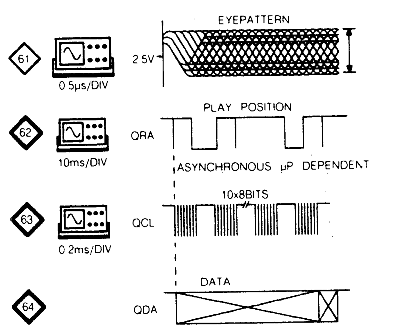
PIN No. / MODE	5	6	2	10
OUT	5V	0V	7.3V	0V
IN	0V	5V	0V	7.3V
STOP	5V	5V	0.5V	0.5V

QM02

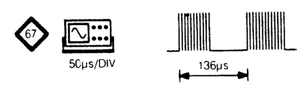
PIN No. / MODE	5	6	2	10
UP	0V	5V	0V	7.3V
DOWN	5V	0V	7.3V	0V
STOP	5V	5V	0.5V	0.5V

⑱ LOW PULSES DURING NEXT AND PREVIOUS

(53) ACTIVITY WHEN USING AN IR REMOTE CONTROL .

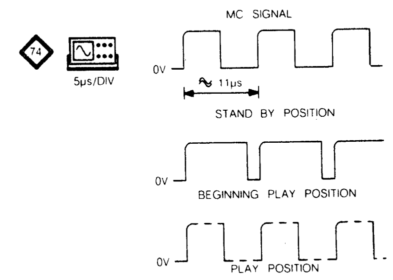

(61)
0 5μs/DIV
2 5V
EYEPATTERN
(62)
10ms/DIV
QRA
PLAY POSITION
ASYNCHRONOUS μP DEPENDENT
(63)
0 2ms/DIV
QCL
10x8BITS
(64)
QDA
DATA

(66) PULSES WHEN THE DISC IS SLOWLY BRAKED BY HAND

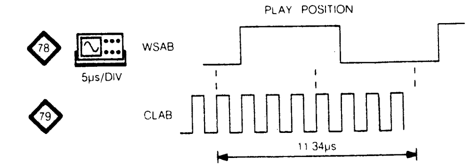

(67)
50μs/DIV
136μs

(68) ACTIVITY DURING PLAY

(69) AUDIO SIGNALS DISC: HIGH ON TRACK 76.78.80.82.84.86.88
LOW ON TRACK 77.79.81.83.85.87.89


(74)
5μs/DIV
MC SIGNAL
0V
≈ 11μs
STAND BY POSITION
0V
BEGINNING PLAY POSITION
0V
PLAY POSITION

(77) 11.2896 MHz SINEWAVE

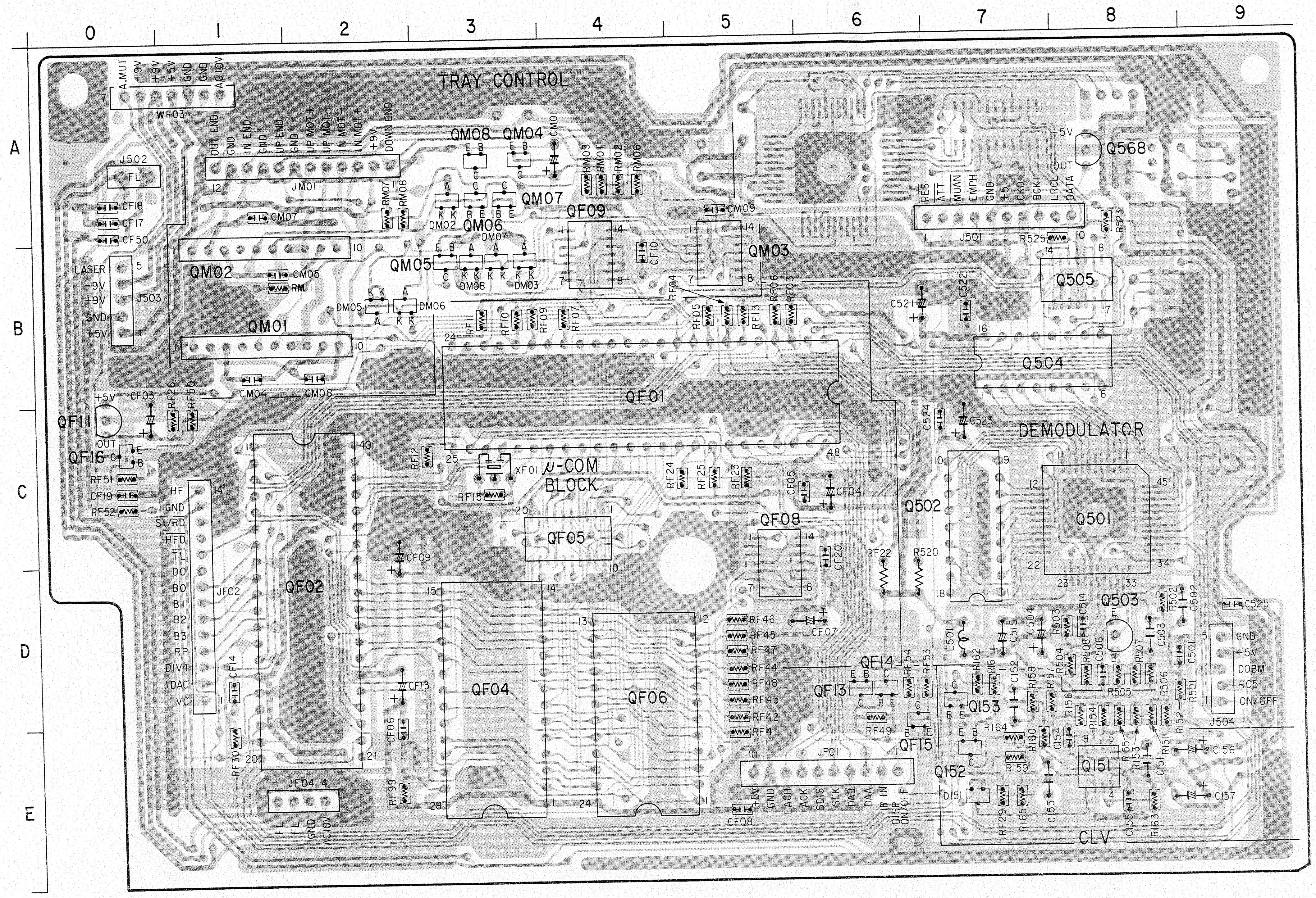

(78)
5μs/DIV
WSAB
PLAY POSITION
(79)
CLAB
11 34μs

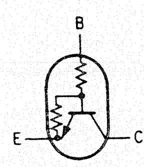
(81) ACTIVITY DURING PLAY

(82) 0 V FOR 12 cm DISC
5 V FOR 8 cm DISC

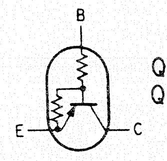
(83) 1 V AT BEGINNING OF DISC
-0.6 V AT END OF DISC

PU16 CONTROL/DECODER (COMPONENT SIDE)

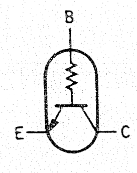

0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
TRAY CONTROL
A.MUT
-9V
+9V
+5V
GND
GND
AC10V
WF03
J502
FL
JM01
OUT END
GND
IN END
GND
UP END
GND
UP MOT+
UP MOT-
IN MOT-
IN MOT+
+9V
DOWN END
QM08
QM04
QM07
QM06
QM05
QM02
QM01
QM03
CM01
CM04
CM05
CM07
CM08
CM09
CF17
CF18
CF50
CF03
CF19
RM01
RM02
RM03
RM06
RM07
RM08
RM11
DM02
DM03
DM05
DM06
DM07
DM08
QF09
CF10
LASER
-9V
+9V
GND
+5V
J503
QF11
QF16
RF51
RF52
RF26
RF50
QF01
μ-COM
BLOCK
XF01
RF15
RF12
RF24
RF25
RF23
CF05
CF04
QF05
CF09
QF08
CF20
QF02
JF02
HF
GND
ST/RD
HFD
TL
DO
BO
B1
B2
B3
RP
DIV4
1DAC
VC
CF14
RF30
JF04
FL
FL
GND
AC10V
CF13
CF06
RF99
QF04
QF06
RF46
RF45
RF47
RF44
RF48
RF43
RF42
RF41
CF07
QF14
QF13
RF49
QF15
RF54
RF53
CF08
JF01
+5V
GND
LACH
ACK
SDIS
SCK
DAB
DAA
IR IN
DISP ON/OFF
RF22
R520
Q502
Q152
D151
RF29
R165
Q153
C152
R162
R161
R160
R164
R159
C153
C154
L501
C515
C504
R158
R157
R156
R154
R155
R153
R151
R152
C155
R163
Q151
C156
C157
CLV
R503
C514
R504
R508
C506
R505
R506
R507
C503
R502
C502
R501
C501
Q503
C525
J504
GND
+5V
DOBM
RC5
ON/OFF
DEMODULATOR
Q501
C524
C523
Q504
C521
C522
Q505
R525
R523
J501
RES
ATT
MUAN
EMPH
GND
+5
CKO
BCK1
LRCL
DATA
+5V
OUT
Q568
RF03
RF04
RF05
RF06
RF07
RF09
RF10
RF11
RF13



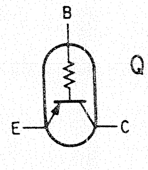
QF14, QM04
QM08



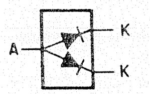
QF13, QM05
QM06, QM07



Q507, Q508
QF15

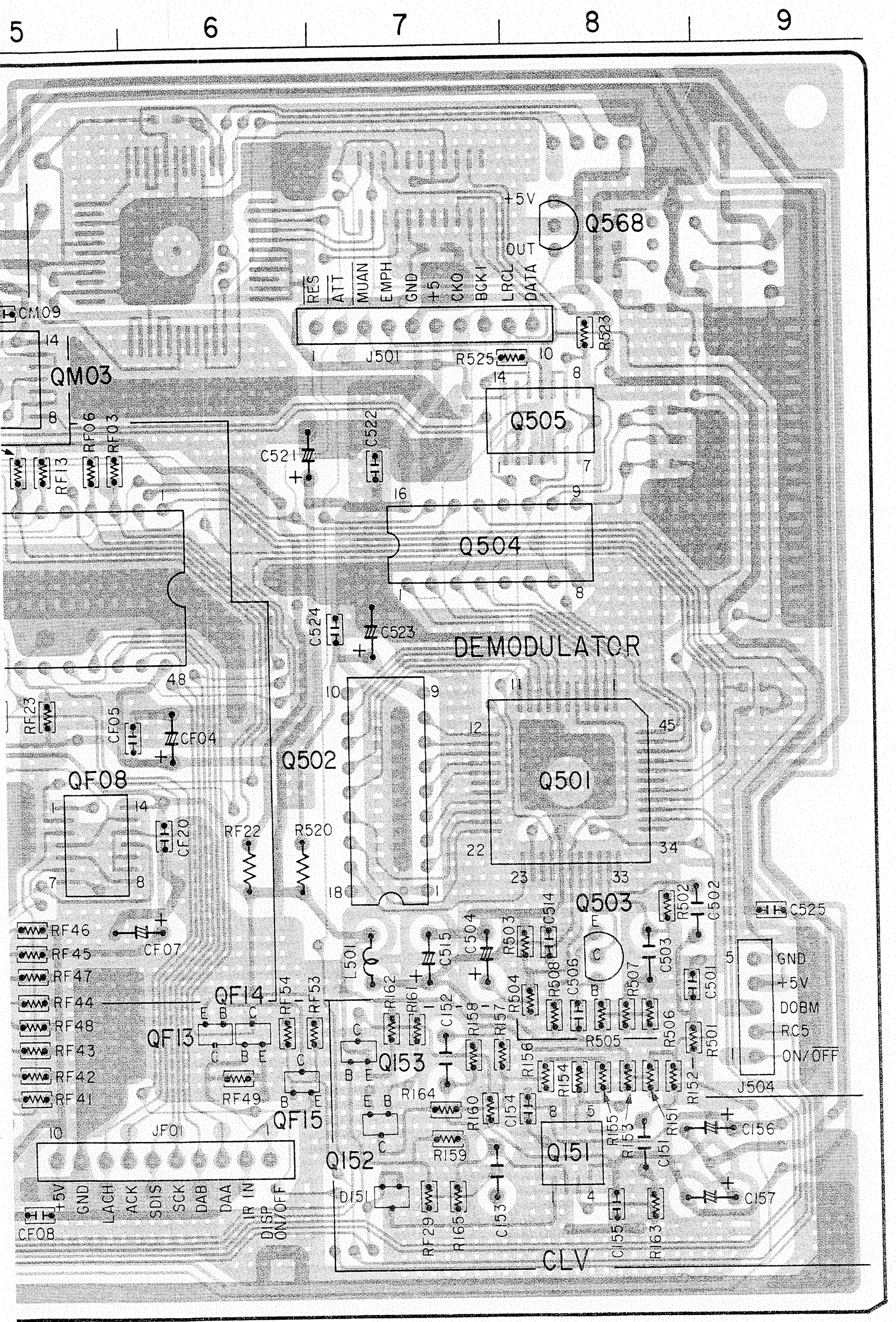


Q153, QF16

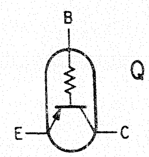


DM03, DM06
DM07, DM08

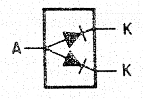
CF03	C0
CF04	C6
CF05	C5
CF06	E2
CF07	D5
CF08	E5
CF09	C2
CF10	B4
CF13	D2
CF14	D1
CF17	A0
CF18	A0
CF19	C0
CF20	D6
CF50	A0
CM01	A4
CM04	B1
CM05	B1
CM07	A1
CM08	B2
CM09	A5
C151	E8
C152	D7
C153	E7
C154	E8
C155	E8
C156	E9
C157	E9
C501	D8
C502	D8
C503	D8
C504	D7
C506	D8
C514	D8
C515	D7
C521	B6
C522	B7
C523	C7
C524	C7
C525	D9
DM02	A3
DM03	B3
DM05	B2
DM06	B2
DM07	B3
DM08	B3
D151	E7
JF01	E6
JF02	D1
JF04	E1
JM01	A2
J501	A7
J502	A0
J503	B0
J504	D9
L501	D7
QF01	B4
QF02	D2
QF04	D3
QF05	C4
QF06	D4
QF08	C5
QF09	B4
QF11	C0
QF13	D6
QF14	D6
QF15	E6
QF16	C0
QM01	B1
QM02	B1
QM03	B5
QM04	A3
QM05	B3
QM06	A3
QM07	A3
QM08	A3
Q151	E8
Q152	E7
Q153	D7
Q501	C8
Q502	C7
Q503	D8
Q504	B7
Q505	B8
Q568	A8
RF03	B5
RF04	B5
RF05	B5
RF06	B5
RF07	B4
RF09	B3
RF10	B3
RF11	B3
RF12	C3
RF13	B5
RF15	C3
RF22	D6
RF23	C5
RF24	C5
RF25	C5
RF26	C1
RF29	E7
RF30	E1
RF41	E5
RF42	D5
RF43	D5
RF44	D5
RF45	D5
RF46	D5
RF47	D5
RF48	D5
RF49	E6
RF50	C1
RF51	C0
RF52	C0
RF53	D6
RF54	D6
RF99	E2
RM01	A4
RM02	A4
RM03	A4
RM06	A4
RM07	A2
RM08	A2
RM11	B1
R151	E8
R152	E8
R153	E8
R154	E8
R155	E8
R156	E8
R157	D7
R158	D7
R159	E7
R160	E7
R161	D7
R162	D7
R163	E8
R164	E7
R165	E7
R501	D8
R502	D8
R503	D8
R504	D8
R505	D8
R506	D8
R507	D8
R508	D8
R520	D6
R523	A8
R525	B8
XF01	C3


5
6
7
8
9
+5V
Q568
RES
ATT
MUAN
EMPH
GND
+5
CK0
BCKI
LRCL
DATA
OUT
CM09
QM03
J501
R525
R523
Q505
C521
C522
RF13
RF06
RF03
Q504
C524
C523
DEMODULATOR
48
RF23
CF05
CF04
QF08
CF20
RF22
R520
Q502
Q501
Q503
C525
RF46
RF45
RF47
RF44
RF48
RF43
RF42
RF41
CF07
QF14
RF54
RF53
QF13
Q153
RF49
QF15
R164
R159
Q152
Q151
L501
R162
R161
C152
R158
R157
C515
C504
R503
C514
C506
R508
R507
R504
R156
R154
R505
R502
C503
C501
R506
R501
C502
GND
+5V
DOBM
RC5
ON/OFF
J504
C156
C157
R160
C154
R155
R153
R151
R152
R163
C155
C153
R165
RF29
D151
JF01
+5V
GND
LACH
ACK
SDIS
SCK
DAB
DAA
IR
DISP ON/OFF
CF08
CLV

7,Q508
5

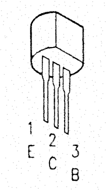


Q153,QF16

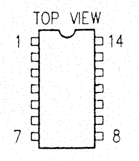


DM03,DM06
DM07,DM08

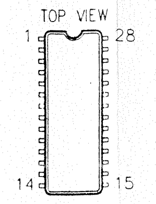
CF03	C0
CF04	C6
CF05	C5
CF06	E2
CF07	D5
CF08	E5
CF09	C2
CF10	B4
CF13	D2
CF14	D1
CF17	A0
CF18	A0
CF19	C0
CF20	D6
CF50	A0
CM01	A4
CM04	B1
CM05	B1
CM07	A1
CM08	B2
CM09	A5
C151	E8
C152	D7
C153	E7
C154	E8
C155	E8
C156	E9
C157	E9
C501	D8
C502	D8
C503	D8
C504	D7
C506	D8
C514	D8
C515	D7
C521	B6
C522	B7
C523	C7
C524	C7
C525	D9
DM02	A3
DM03	B3
DM05	B2
DM06	B2
DM07	B3
DM08	B3
D151	E7
JF01	E6
JF02	D1
JF04	E1
JM01	A2
J501	A7
J502	A0
J503	B0
J504	D9
L501	D7
QF01	B4
QF02	D2
QF04	D3
QF05	C4
QF06	D4
QF08	C5
QF09	B4
QF11	C0
QF13	D6
QF14	D6
QF15	E6
QF16	C0
QM01	B1
QM02	B1
QM03	B5
QM04	A3
QM05	B3
QM06	A3
QM07	A3
QM08	A3
Q151	E8
Q152	E7
Q153	D7
Q501	C8
Q502	C7
Q503	D8
Q504	B7
Q505	B8
Q568	A8
RF03	B5
RF04	B5
RF05	B5
RF06	B5
RF07	B4
RF09	B3
RF10	B3
RF11	B3
RF12	C3
RF13	B5
RF15	C3
RF22	D6
RF23	C5
RF24	C5
RF25	C5
RF26	C1
RF29	E7
RF30	E1
RF41	E5
RF42	D5
RF43	D5
RF44	D5
RF45	D5
RF46	D5
RF47	D5
RF48	D5
RF49	E6
RF50	C1
RF51	C0
RF52	C0
RF53	D6
RF54	D6
RF99	E2
RM01	A4
RM02	A4
RM03	A4
RM06	A4
RM07	A2
RM08	A2
RM11	B1
R151	E8
R152	E8
R153	E8
R154	E8
R155	E8
R156	E8
R157	D7
R158	D7
R159	E7
R160	E7
R161	D7
R162	D7
R163	E8
R164	E7
R165	E7
R501	D8
R502	D8
R503	D8
R504	D8
R505	D8
R506	D8
R507	D8
R508	D8
R520	D6
R523	A8
R525	B8
XF01	C3



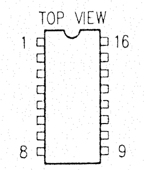
PST523D
PST529
2SA1005L/K


TOP VIEW
1
14
7
8

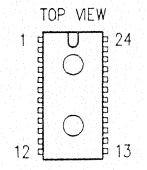
74HC00
74HC08


TOP VIEW
1
28
14
15

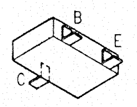
M27128A-2F1


TOP VIEW
1
16
8
9

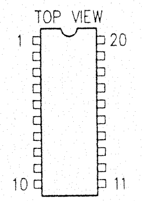
PCF3523


TOP VIEW
1
24
12
13

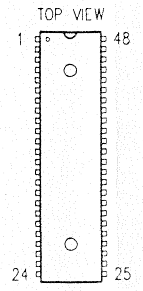
MSM2816A



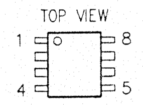
DTA114YK,DTA114EK
DTC144EK,DTC114EK
DTA144TK,2SA1162


TOP VIEW
1
20
10
11

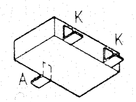
74HC373F


TOP VIEW
1
48
24
25

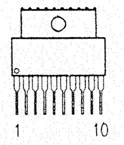
MC68HC11A0P


TOP VIEW
1
8
4
5

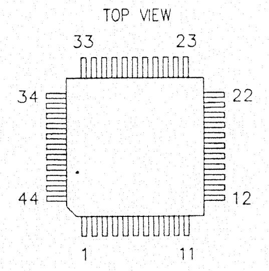
NJM4560D



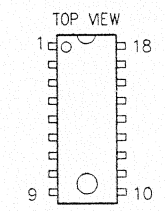
MA153
MA151WA
MA151K



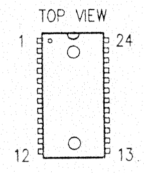
LB1645N


TOP VIEW
33
23
34
22
44
12
1
11

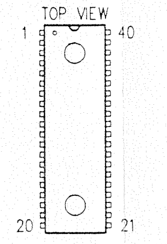
SAA7310


TOP VIEW
1
18
9
10

MB81416C-15
MN4264P-15

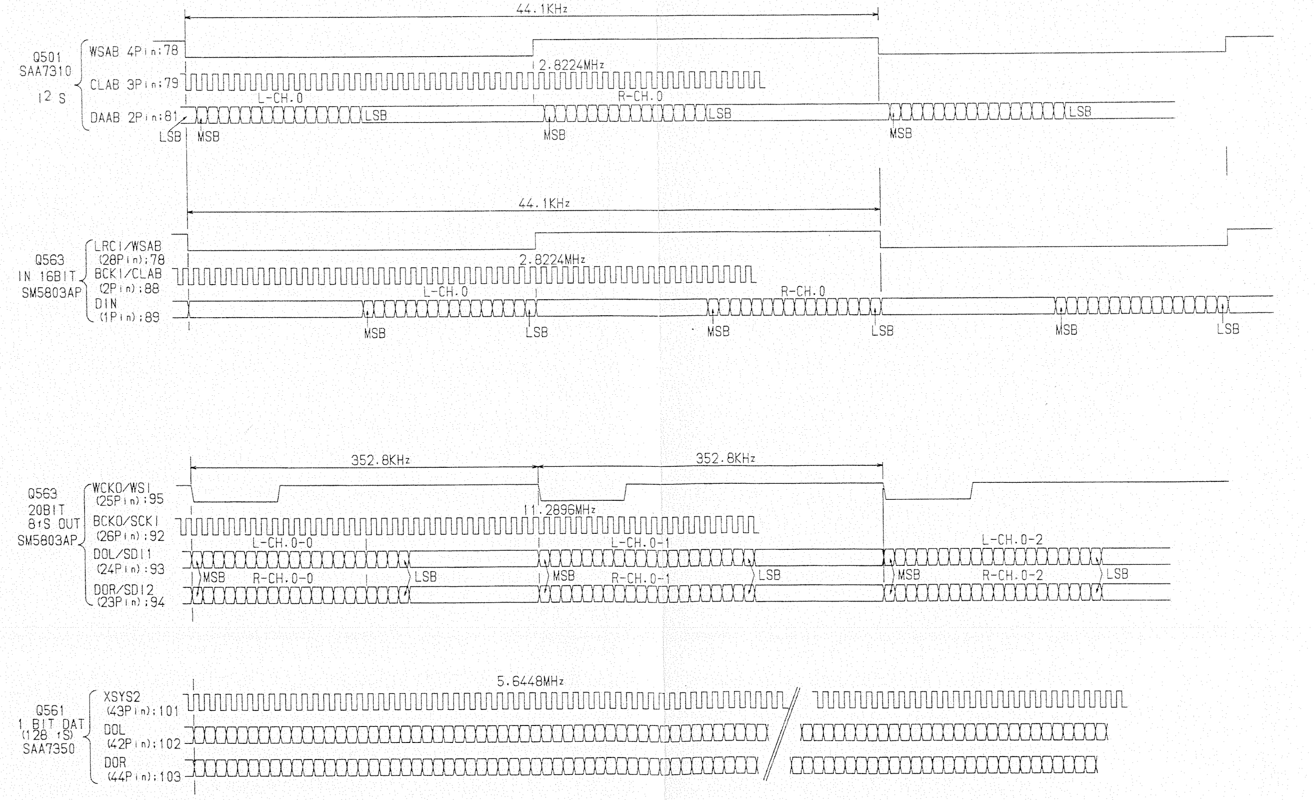

TOP VIEW
1
24
12
13

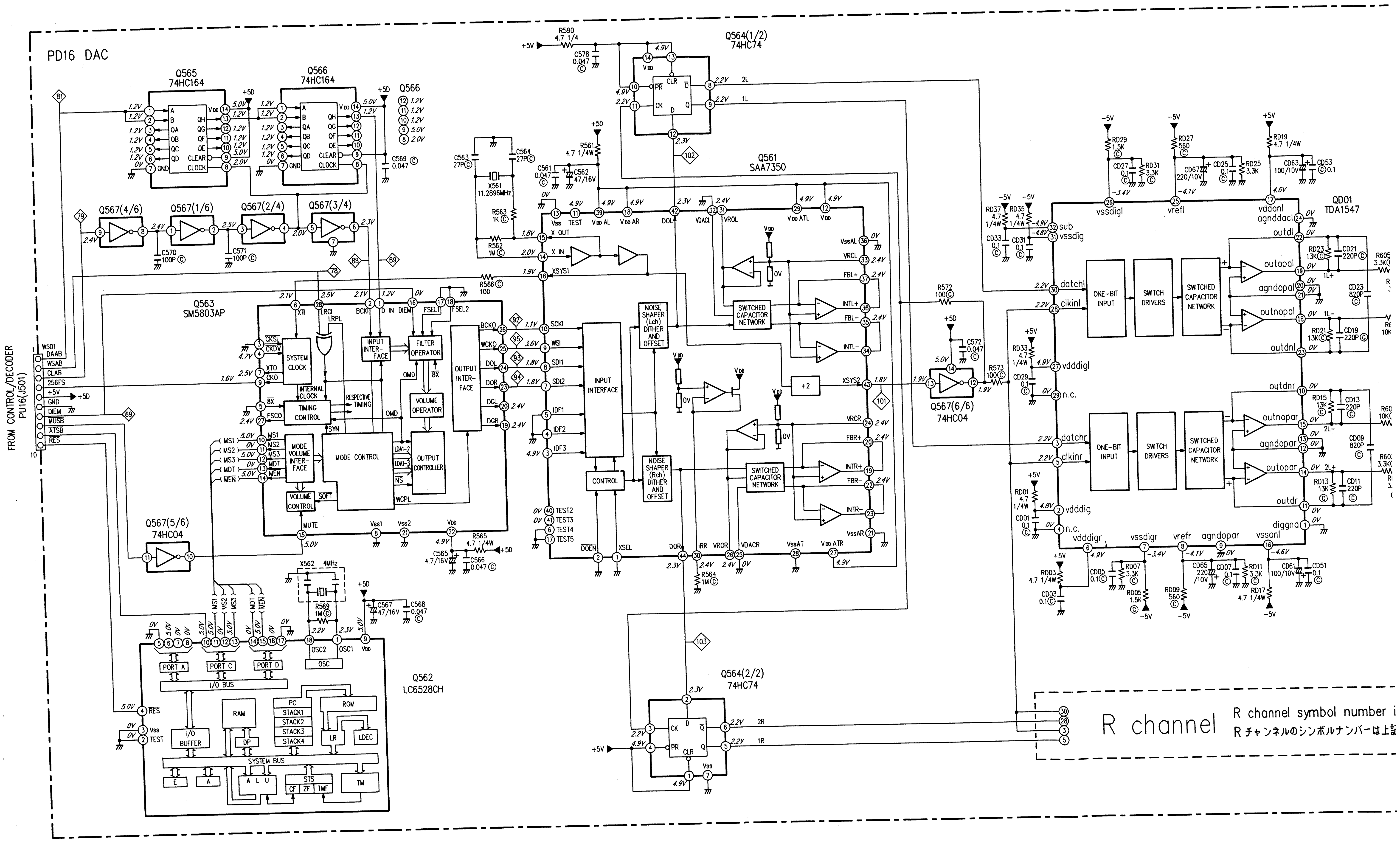
MSM2816A

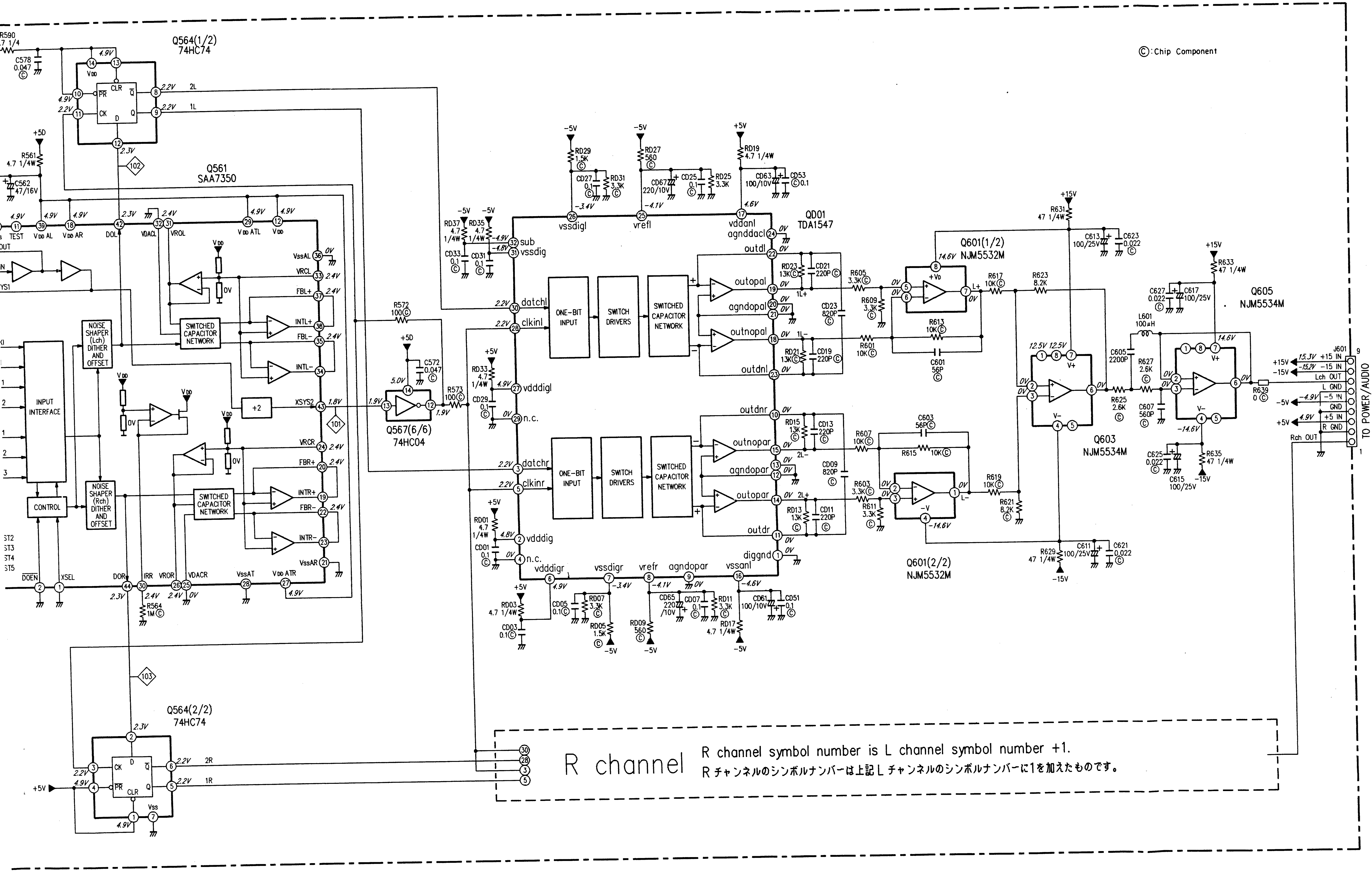

TOP VIEW
1
40
20
21

MC68HC24

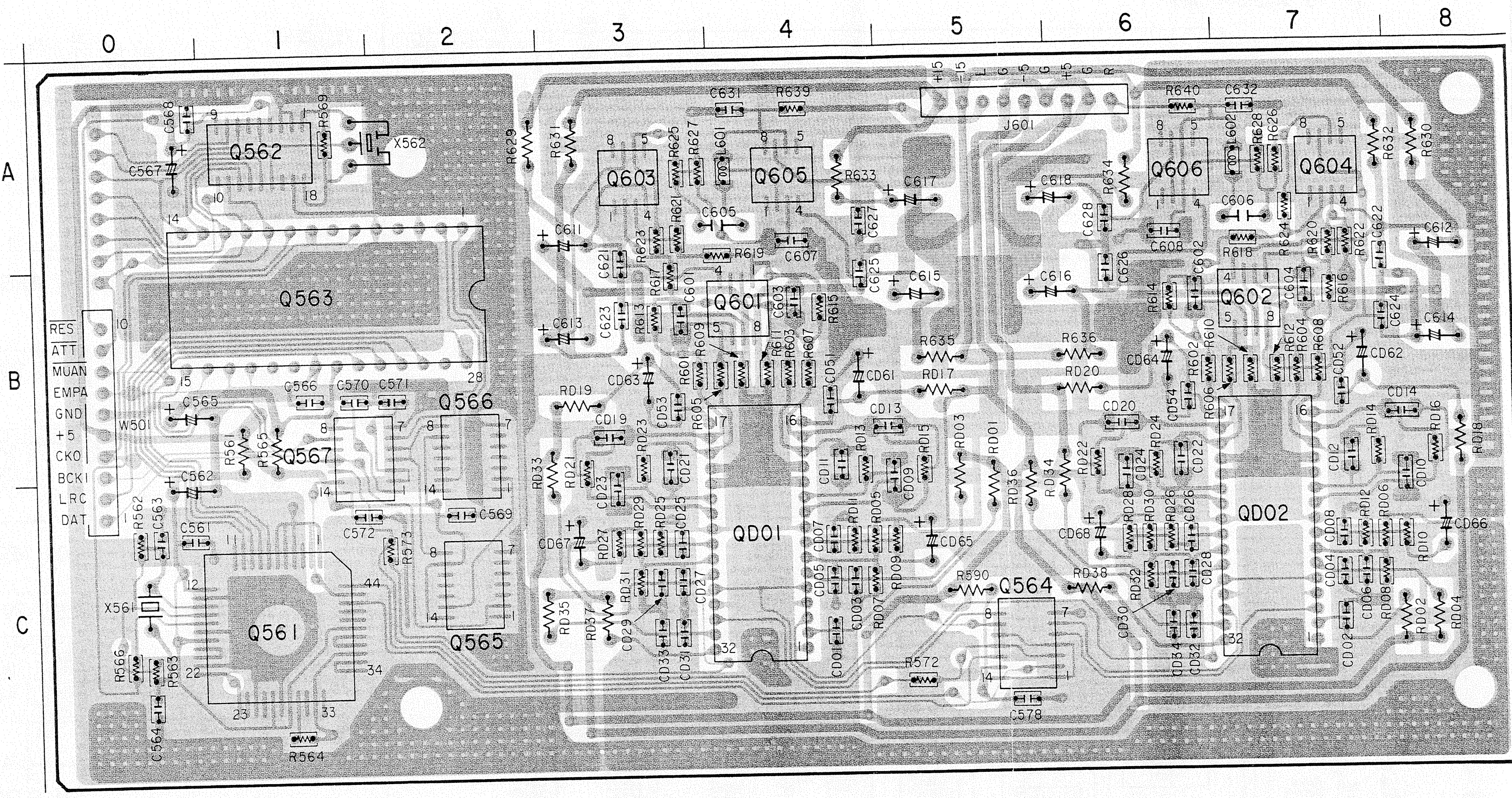
TIMING CHART

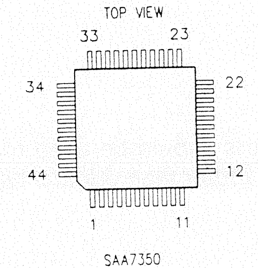

44.1KHz
Q501
SAA7310
I2S
WSAB 4Pin:78
CLAB 3Pin:79
DAAB 2Pin:81
2.8224MHz
L-CH.0
R-CH.0
LSB
MSB
44.1KHz
Q563
IN 16BIT
SM5803AP
LRCI/WSAB (28Pin):78
BCKI/CLAB (2Pin):88
DIN (1Pin):89
2.8224MHz
L-CH.0
R-CH.0
MSB
LSB
352.8KHz
352.8KHz
Q563
20BIT
8fs OUT
SM5803AP
WCKO/WSI (25Pin):95
BCKO/SCKI (26Pin):92
DOL/SDI1 (24Pin):93
DOR/SDI2 (23Pin):94
11.2896MHz
L-CH.0-0
L-CH.0-1
L-CH.0-2
MSB
R-CH.0-0
R-CH.0-1
R-CH.0-2
LSB
5.6448MHz
Q561
1 BIT DAT
(128 fs)
SAA7350
XSYS2 (43Pin):101
DOL (42Pin):102
DOR (44Pin):103

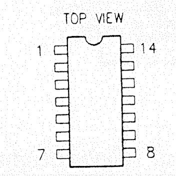

PD16 DAC
Q565
74HC164
Q566
74HC164
Q567(4/6)
Q567(1/6)
Q567(2/4)
Q567(3/4)
Q563
SM5803AP
SYSTEM CLOCK
INPUT INTER-FACE
FILTER OPERATOR
OUTPUT INTER-FACE
TIMING CONTROL
MODE VOLUME INTER-FACE
MODE CONTROL
VOLUME OPERATOR
OUTPUT CONTROLLER
VOLUME CONTROL
Q567(5/6)
74HC04
Q562
LC6528CH
PORT A
PORT C
PORT D
I/O BUS
I/O BUFFER
RAM
DP
PC
STACK1
STACK2
STACK3
STACK4
ROM
LR
LDEC
SYSTEM BUS
E
A
ALU
STS
CF
ZF
TMF
TM
OSC
X562 4MHz
X561 11.2896MHz
Q564(1/2)
74HC74
Q564(2/2)
74HC74
Q561
SAA7350
INPUT INTERFACE
CONTROL
NOISE SHAPER (Lch) DITHER AND OFFSET
NOISE SHAPER (Rch) DITHER AND OFFSET
SWITCHED CAPACITOR NETWORK
÷2
Q567(6/6)
74HC04
QD01
TDA1547
ONE-BIT INPUT
SWITCH DRIVERS
SWITCHED CAPACITOR NETWORK
FROM CONTROL/DECODER PU16(J501)
W501
DAAB
WSAB
CLAB
256FS
+5V
GND
DIEM
MUSB
ATSB
RES
R channel
R channel symbol number i
Rチャンネルのシンボルナンバーは上記

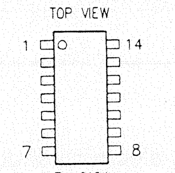

©:Chip Component
Q564(1/2)
74HC74
Q561
SAA7350
Q567(6/6)
74HC04
QD01
TDA1547
Q601(1/2)
NJM5532M
Q601(2/2)
NJM5532M
Q603
NJM5534M
Q605
NJM5534M
Q564(2/2)
74HC74
INPUT INTERFACE
CONTROL
NOISE SHAPER (Lch) DITHER AND OFFSET
NOISE SHAPER (Rch) DITHER AND OFFSET
SWITCHED CAPACITOR NETWORK
ONE-BIT INPUT
SWITCH DRIVERS
+2
J601
TO POWER/AUDIO PP16(W601)
+15 IN
-15 IN
Lch OUT
L GND
-5 IN
GND
+5 IN
R GND
Rch OUT
R channel
R channel symbol number is L channel symbol number +1.
Rチャンネルのシンボルナンバーは上記Lチャンネルのシンボルナンバーに1を加えたものです。

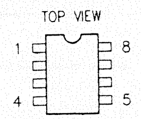
PD16 DAC (COMPONENT SIDE)

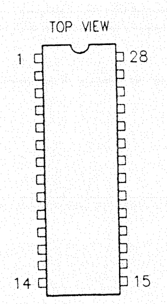

0
1
2
3
4
5
6
7
8
A
B
C
Q561
Q562
Q563
Q564
Q565
Q566
Q567
Q601
Q602
Q603
Q604
Q605
Q606
QD01
QD02
J601
X561
X562
W501
RES
ATT
MUAN
EMPA
GND
+5
CKO
BCKI
LRC
DAT

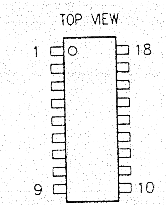

TOP VIEW
33
23
34
22
44
12
1
11
SAA7350

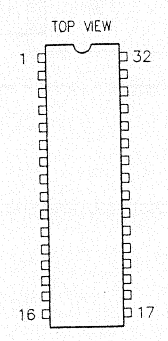

TOP VIEW
1
14
7
8
74HC04
74HC74F


TOP VIEW
1
14
7
8
74HC164

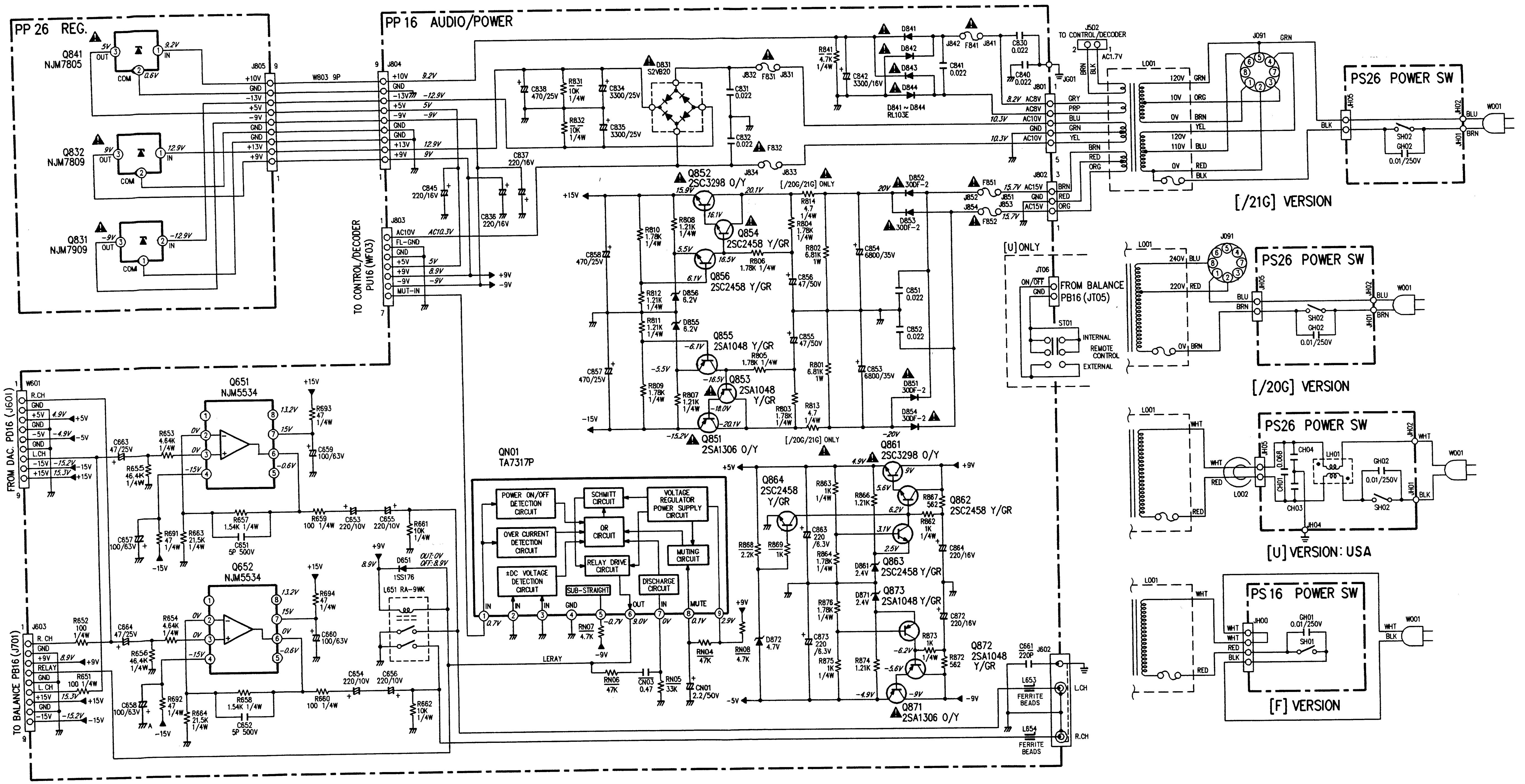

TOP VIEW
1
8
4
5
NJM5532M
NJM5534M


TOP VIEW
1
28
14
15
SM5803AP


TOP VIEW
1
18
9
10
LC6528CH


TOP VIEW
1
32
16
17
TDA1547

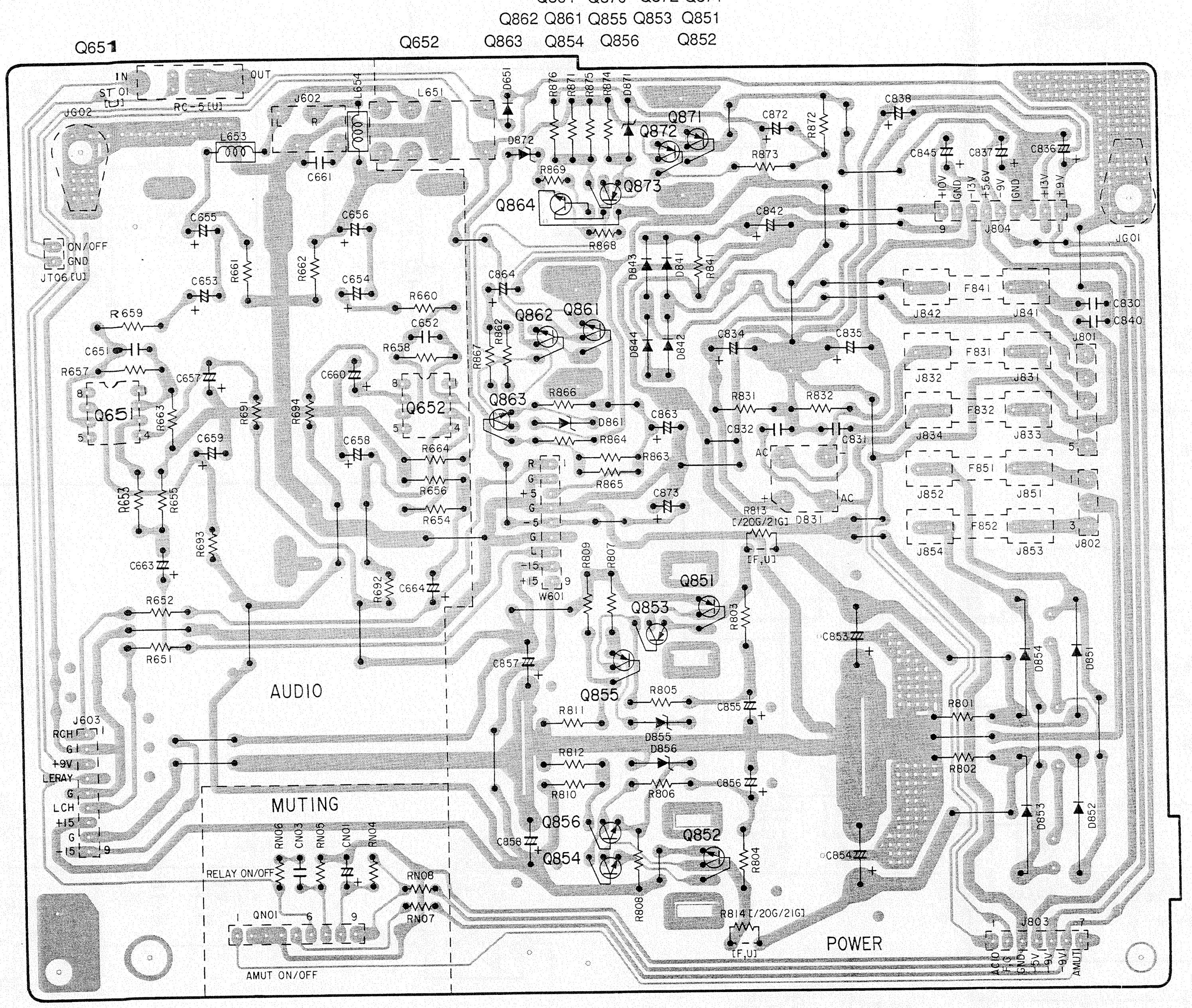
CD01	C4
CD02	C7
CD03	C4
CD04	C7
CD05	C4
CD06	C7
CD07	C4
CD08	C7
CD09	B5
CD10	C8
CD11	B4
CD12	B7
CD13	B4
CD14	B8
CD19	B3
CD20	B6
CD21	B3
CD22	B6
CD23	C3
CD24	B6
CD25	C3
CD26	C6
CD27	C3
CD28	C6
CD29	C3
CD30	C6
CD31	C3
CD32	C6
CD33	C3
CD34	C6
CD51	B4
CD52	B7
CD53	B3
CD54	B6
CD61	B4
CD62	B7
CD63	B3
CD64	B6
CD65	C5
CD66	C8
CD67	C3
CD68	C6
C561	C0
C562	C0
C563	C0
C564	C0
C565	B0
C566	B1
C567	A0
C568	A0
C569	C2
C570	B1
C571	B2
C572	C1
C578	C5
C601	B3
C602	B6
C603	B4
C604	B7
C605	A3
C606	A6
C607	A4
C608	A6
C611	A3
C612	A8
C613	B3
C614	B8
C615	B5
C616	B5
C617	A5
C618	A5
C621	A3
C622	A7
C623	B3
C624	B7
C625	A4
C626	A6
C627	A4
C628	A6
C631	A4
C632	A7
J601	A5
L601	A4
L602	A7
QD01	C4
QD02	C7
Q561	C1
Q562	A1
Q563	B1
Q564	C5
Q565	C2
Q566	B2
Q567	B1
Q601	B4
Q602	B7
Q603	A3
Q604	A7
Q605	A4
Q606	A6
RD01	C5
RD02	C8
RD03	B5
RD04	C8
RD05	C4
RD06	C7
RD07	C4
RD08	C7
RD09	C5
RD10	C8
RD11	C4
RD12	C7
RD13	B4
RD14	B7
RD15	B5
RD16	B8
RD17	B5
RD18	B8
RD19	B3
RD20	B6
RD21	B3
RD22	B6
RD23	B3
RD24	B6
RD25	C3
RD26	C6
RD27	C3
RD28	C6
RD29	C3
RD30	C6
RD31	C3
RD32	C6
RD33	B2
RD34	B6
RD35	C2
RD36	C5
RD37	C3
RD38	C6
R561	B1
R562	C0
R563	C0
R564	C1
R565	B1
R566	C0
R569	A1
R572	C5
R573	C2
R590	C5
R601	B3
R602	B6
R603	B4
R604	B7
R605	B3
R606	B7
R607	B4
R608	B7
R609	B4
R610	B7
R611	B4
R612	B7
R613	B3
R614	B6
R615	B4
R616	B7
R617	A3
R618	A7
R619	A3
R620	A7
R621	A3
R622	A7
R623	A3
R624	A7
R625	A3
R626	A7
R627	A3
R628	A7
R629	A2
R630	A8
R631	A3
R632	A7
R633	A4
R634	A6
R635	B5
R636	B6
R639	A4
R640	A6
W501	B0
X561	C0
X562	A1


PP 26 REG.
Q841
NJM7805
Q832
NJM7809
Q831
NJM7909
W803 9P
PP 16 AUDIO/POWER
TO CONTROL/DECODER PU16 (WF03)
FROM DAC. PD16 (J601)
TO BALANCE PB16 (J701)
Q651
NJM5534
Q652
NJM5534
QN01
TA7317P
POWER ON/OFF DETECTION CIRCUIT
SCHMITT CIRCUIT
VOLTAGE REGULATOR POWER SUPPLY CIRCUIT
OVER CURRENT DETECTION CIRCUIT
OR CIRCUIT
RELAY DRIVE CIRCUIT
MUTING CIRCUIT
±DC VOLTAGE DETECTION CIRCUIT
SUB-STRAIGHT
DISCHARGE CIRCUIT
L651 RA-9WK
D831
S2VB20
Q852
2SC3298 O/Y
Q854
2SC2458 Y/GR
Q856
2SC2458 Y/GR
Q855
2SA1048 Y/GR
Q853
2SA1048 Y/GR
Q851
2SA1306 O/Y
Q861
2SC3298 O/Y
Q864
2SC2458 Y/GR
Q862
2SC2458 Y/GR
Q863
2SC2458 Y/GR
Q873
2SA1048 Y/GR
Q872
2SA1048 Y/GR
Q871
2SA1306 O/Y
D841 ~ D844
RL103E
[/20G/21G] ONLY
TO CONTROL/DECODER
[U] ONLY
FROM BALANCE PB16 (JT05)
INTERNAL
REMOTE CONTROL
EXTERNAL
FERRITE BEADS
L.CH
R.CH
PS26 POWER SW
[/21G] VERSION
PS26 POWER SW
[/20G] VERSION
PS26 POWER SW
[U] VERSION: USA
PS16 POWER SW
[F] VERSION

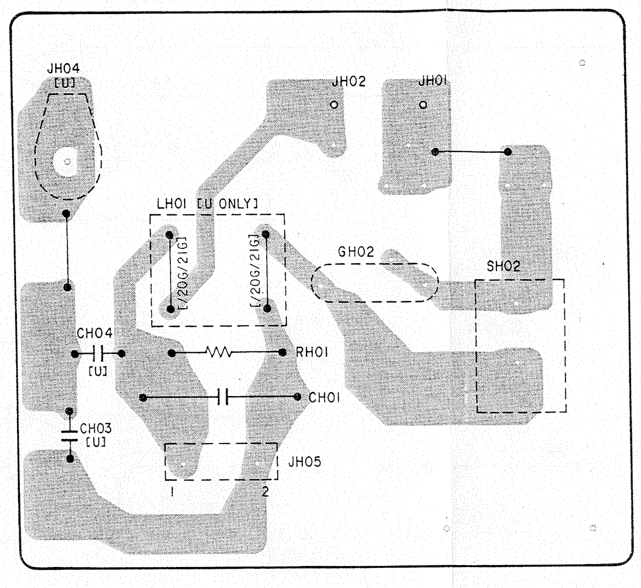
NOTE ON SAFETY:

Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

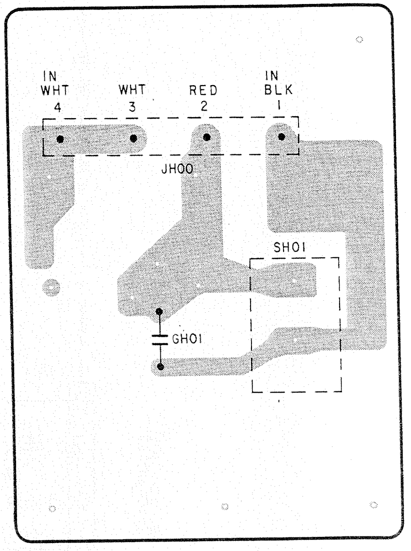
PP16 POWER/AUDIO


Q864 Q873 Q872 Q871
Q862 Q861 Q855 Q853 Q851
Q651
Q652
Q863 Q854 Q856 Q852
IN
ST 01
[U]
OUT
RC-5 [U]
J602
J601
L654
L651
L653
C661
C655
C656
C653
C654
C651
C652
C657
C658
C659
C660
C663
C664
R659
R657
R661
R662
R660
R658
R663
R691
R694
R653
R655
R693
R664
R656
R654
R692
R652
R651
Q651
Q652
ON/OFF
GND
JT06 [U]
AUDIO
J603
RCH
G
+9V
LERAY
G
LCH
+15
G
+15
9
MUTING
RN06
CN03
RN05
CN01
RN04
RN08
RN07
RELAY ON/OFF
QN01
AMUT ON/OFF
D651
D872
R876
R871
R875
R874
D871
R869
R868
Q864
Q871
Q872
Q873
C872
R873
R872
C838
C842
C864
R867
R862
Q862
Q861
Q863
R866
D861
R864
R863
R865
C863
C873
D843
D841
R841
D844
D842
C834
C835
R831
R832
C832
C831
C845
C837
C836
+10V
GND
-13V
+5.6V
-9V
GND
+13V
+9V
J804
JG01
F841
J842
J841
C830
C840
J801
F831
J832
J831
F832
J834
J833
F851
J852
J851
F852
J854
J853
J802
AC
R813
[/20G/21G]
[F,U]
D831
W601
R809
R807
R803
Q851
Q853
C853
C857
Q855
R805
R811
D855
D856
R812
R810
R806
C855
C856
C858
Q856
Q854
Q852
R808
R804
R814 [/20G/21G]
[F,U]
C854
R801
R802
D854
D851
D853
D852
J803
POWER
AC10
GND
+5V
-9V
AMUT

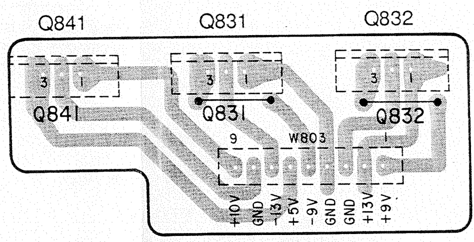
PS26 POWER SW [/20G/21G, U] VERSION

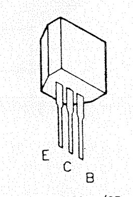

JH04
[U]
JH02
JH01
LH01 [U ONLY]
[/20G/21G]
[/20G/21G]
GH02
SH02
CH04
[U]
RH01
CH01
CH03
[U]
JH05
1
2

PS16 POWER SW [F] VERSION

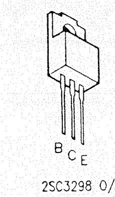

IN
WHT
4
WHT
3
RED
2
IN
BLK
1
JH00
SH01
GH01

PP26 REGULATOR

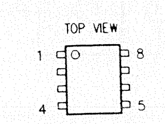

Q841
Q831
Q832
3
1
Q841
Q831
Q832
9
W803
1
+10V
GND
-13V
+5V
-9V
GND
GND
+13V
+9V



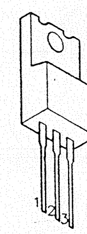
2SC2458 Y/GR
2CA1048 Y/GR



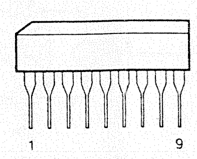
2SC3298 O/Y
2SA1306 O/Y


TOP VIEW
1
8
4
5

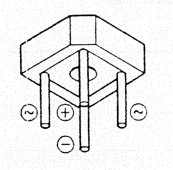
NJM5534D



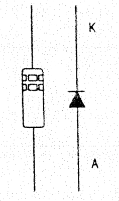
NJM7909FA
NJM7809FA
NJM7805FA



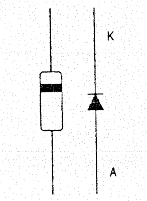
TA7317P



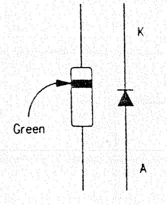
S2VB20



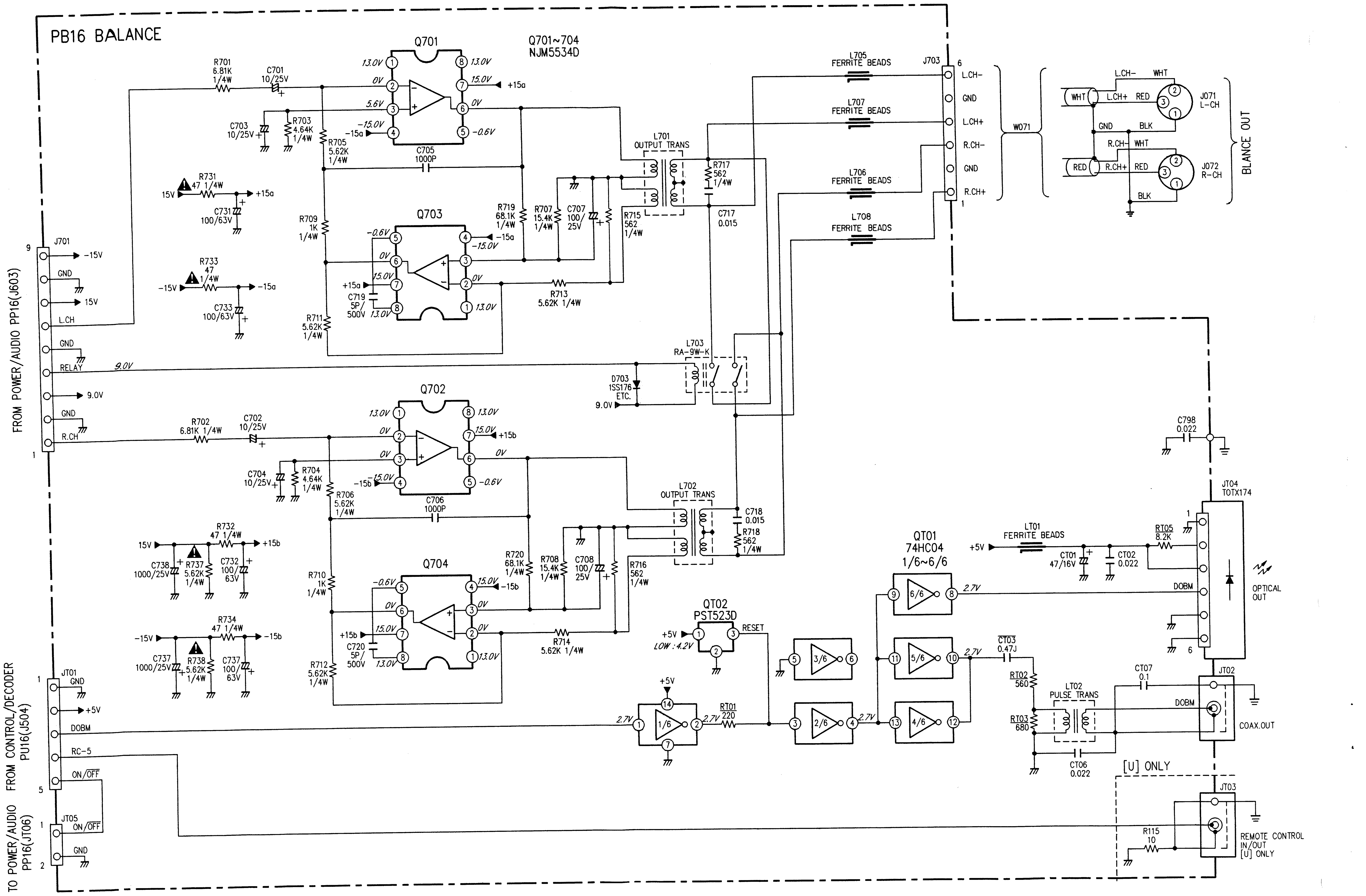
300F-2



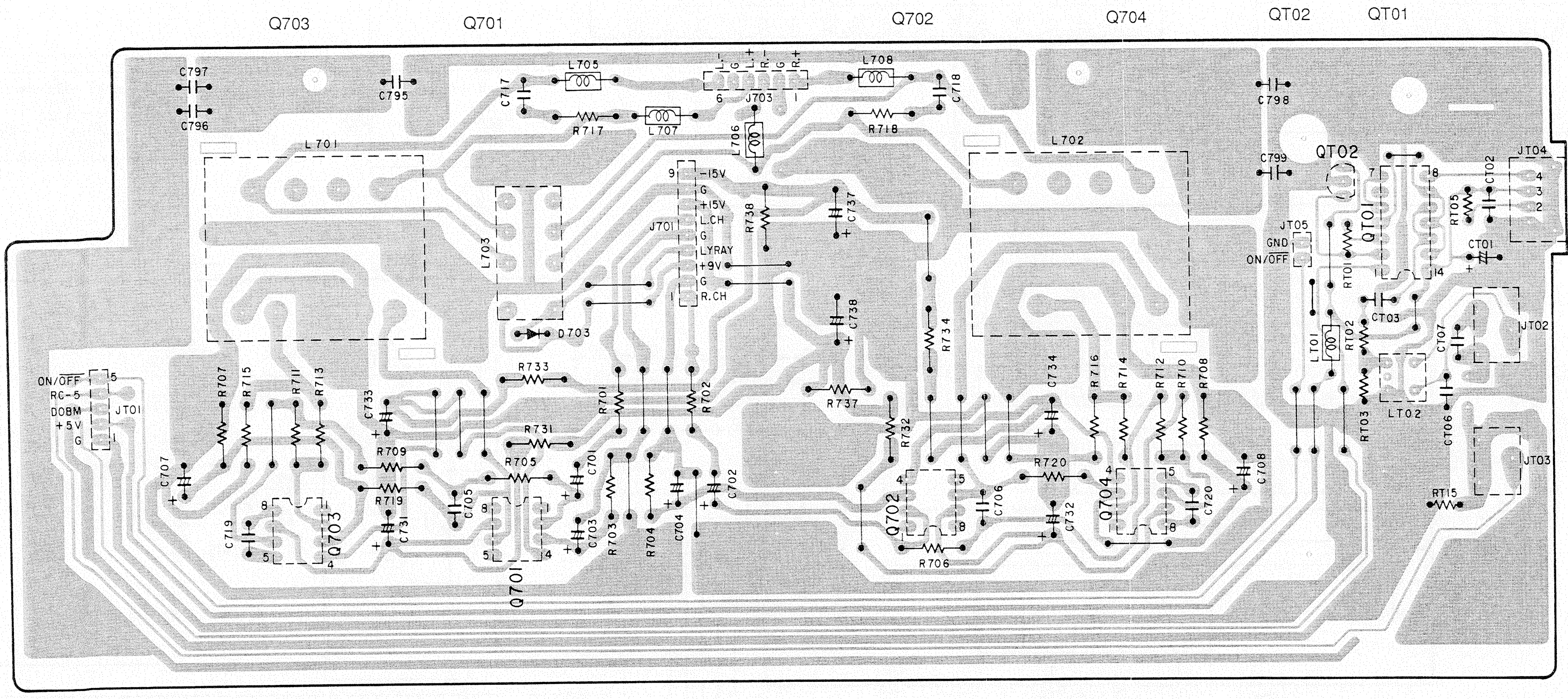
HZ6L

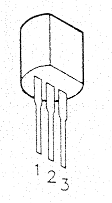


1SS176

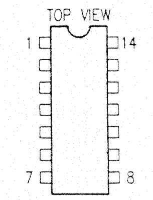

PB16 BALANCE
Q701
Q701~704
NJM5534D
R701
6.81K
1/4W
C701
10/25V
13.0V
0V
5.6V
-15.0V
-15a
15.0V
+15a
-0.6V
C703
10/25V
R703
4.64K
1/4W
R705
5.62K
1/4W
C705
1000P
R731
47 1/4W
15V
C731
100/63V
R733
47
1/4W
-15V
-15a
C733
100/63V
Q703
R709
1K
1/4W
R711
5.62K
1/4W
+15a
C719
5P/
500V
R719
68.1K
1/4W
R707
15.4K
1/4W
C707
100/
25V
R713
5.62K 1/4W
R715
562
1/4W
L701
OUTPUT TRANS
R717
562
1/4W
C717
0.015
L705
FERRITE BEADS
L707
FERRITE BEADS
L706
FERRITE BEADS
L708
FERRITE BEADS
J703
6
L.CH-
GND
L.CH+
R.CH-
GND
R.CH+
1
W071
WHT
L.CH-
L.CH+
RED
GND
BLK
R.CH-
R.CH+
J071
L-CH
J072
R-CH
BLANCE OUT
9
J701
-15V
GND
15V
L.CH
GND
RELAY
9.0V
9.0V
GND
R.CH
1
FROM POWER/AUDIO PP16(J603)
L703
RA-9W-K
D703
1SS176
ETC.
9.0V
Q702
R702
6.81K 1/4W
C702
10/25V
C704
10/25V
R704
4.64K
1/4W
-15b
R706
5.62K
1/4W
C706
1000P
+15b
L702
OUTPUT TRANS
C718
0.015
R718
562
1/4W
R732
47 1/4W
+15b
C738
1000/25V
R737
5.62K
1/4W
C732
100/
63V
Q704
R710
1K
1/4W
R720
68.1K
1/4W
R708
15.4K
1/4W
C708
100/
25V
R716
562
1/4W
R714
5.62K 1/4W
R734
47 1/4W
-15b
C737
1000/25V
R738
5.62K
1/4W
C737
100/
63V
C720
5P/
500V
R712
5.62K
1/4W
C798
0.022
JT04
TOTX174
QT01
74HC04
1/6~6/6
+5V
LT01
FERRITE BEADS
CT01
47/16V
CT02
0.022
RT05
8.2K
DOBM
OPTICAL
OUT
2.7V
6/6
QT02
PST523D
RESET
+5V
LOW : 4.2V
3/6
5/6
CT03
0.47J
RT02
560
LT02
PULSE TRANS
CT07
0.1
JT02
COAX.OUT
RT03
680
CT06
0.022
JT01
GND
+5V
DOBM
RC-5
ON/OFF
5
FROM CONTROL/DECODER
PU16(J504)
1/6
RT01
220
2/6
4/6
[U] ONLY
JT03
R115
10
REMOTE CONTROL
IN/OUT
[U] ONLY
JT05
ON/OFF
GND
2
TO POWER/AUDIO
PP16(JT06)

PB16 BALANCE

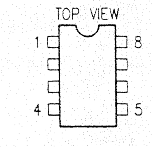

Q703
Q701
Q702
Q704
QT02
QT01
C797
C796
C795
C717
L705
R717
L707
J703
L706
L708
R718
C718
C798
C799
L701
L703
L702
J701
-15V
+15V
L.CH
LYRAY
+9V
R.CH
R738
C737
C738
R734
D703
R733
R731
R705
R709
R719
R737
R732
R720
R706
ON/OFF
RC-5
DOBM
+5V
G
JT01
R707
R715
R711
R713
C733
C707
C719
C731
C705
C701
C703
R701
R702
R703
R704
C704
C702
C734
R716
R714
R712
R710
R708
C706
C732
C720
C708
JT05
GND
ON/OFF
RT01
RT02
RT03
RT05
LT01
LT02
CT01
CT02
CT03
CT06
CT07
JT02
JT03
JT04
RT15



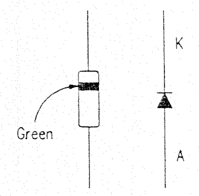
PST523D


TOP VIEW
1
14
7
8

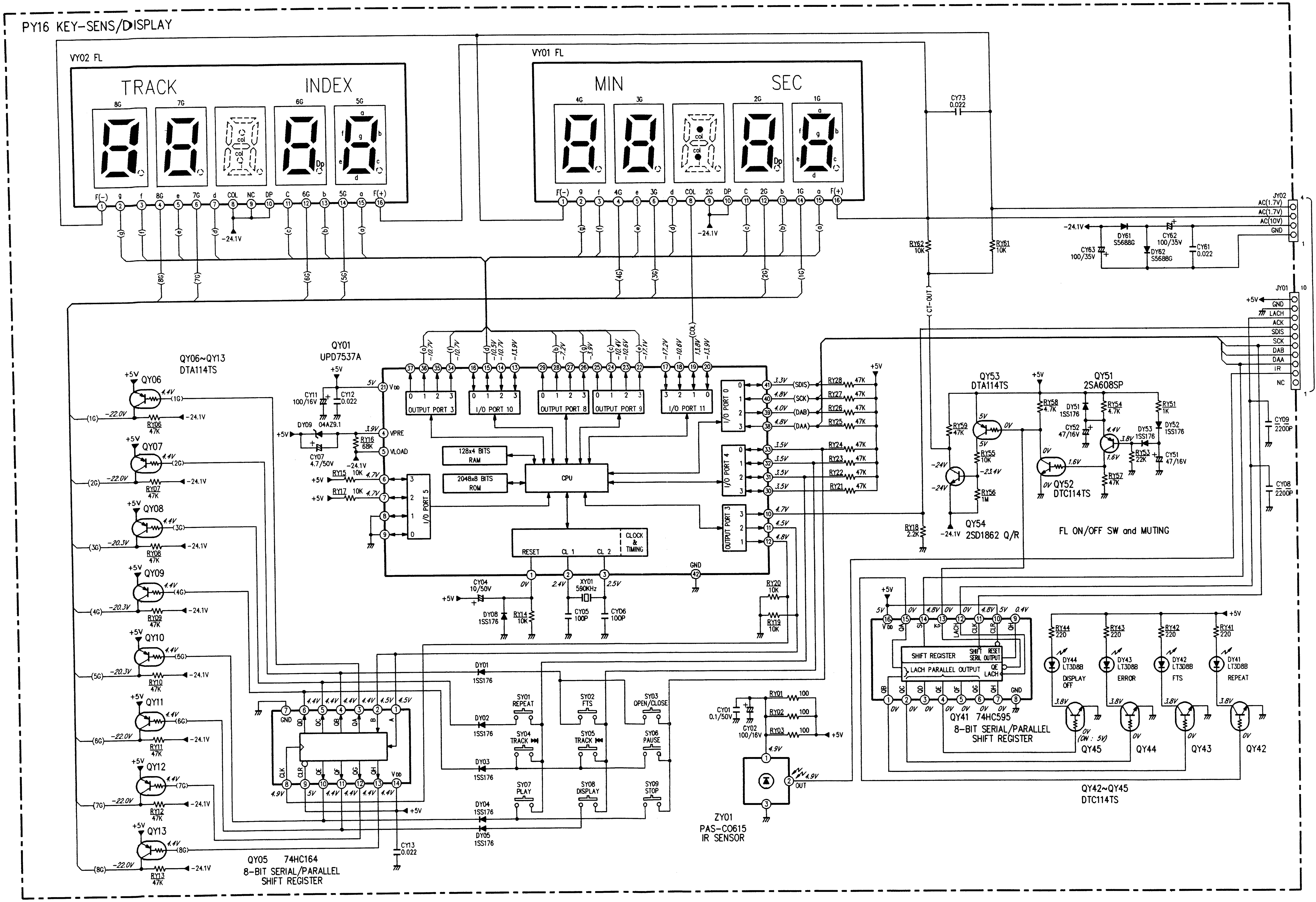
74HCU04


TOP VIEW
1
8
4
5

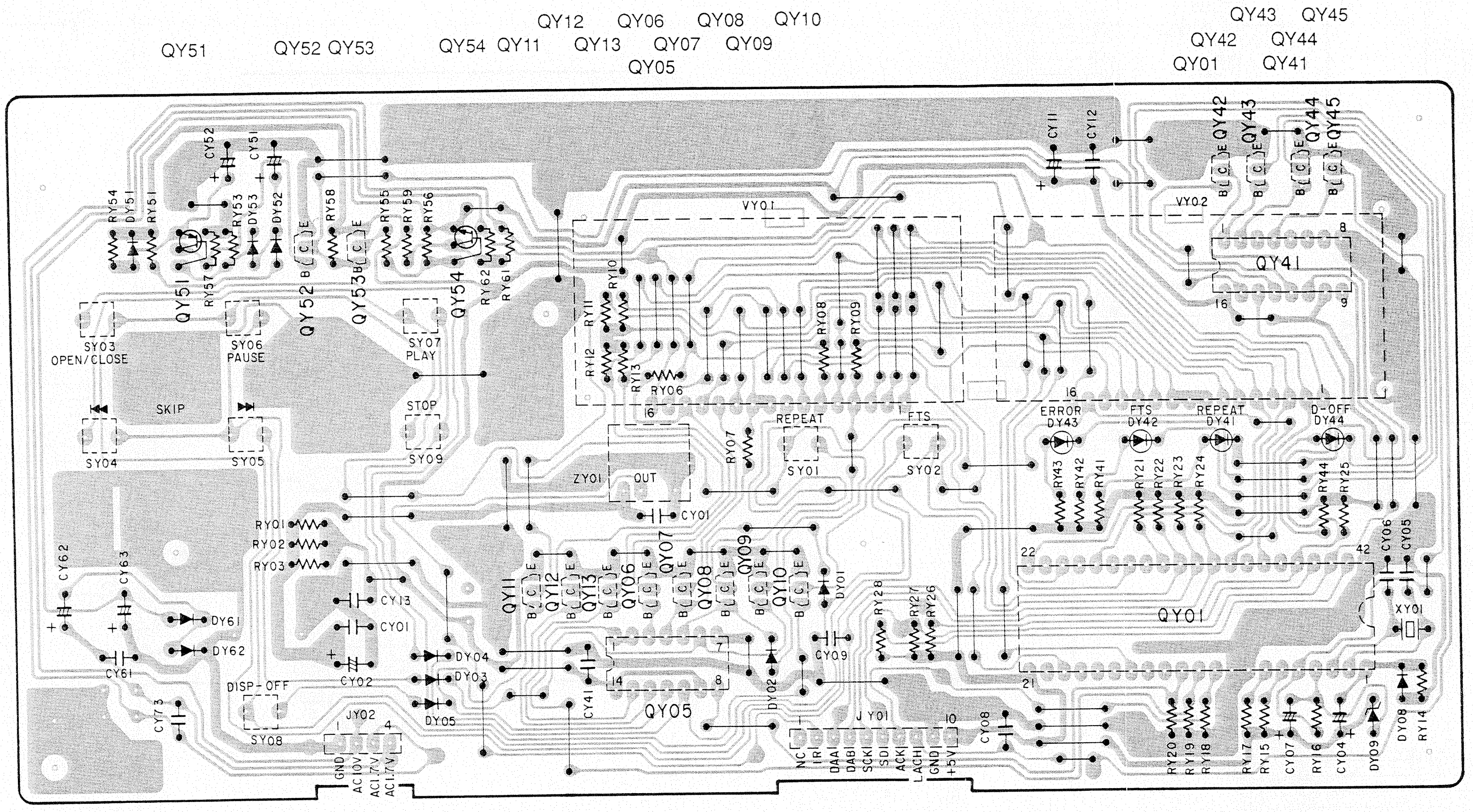
NJM5534D

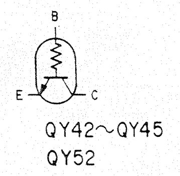


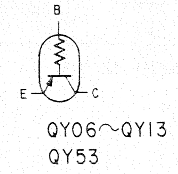
1SS176

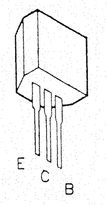

PY16 KEY-SENS/DISPLAY
VY02 FL
TRACK
INDEX
VY01 FL
MIN
SEC
CY73 0.022
JY02
AC(1.7V)
AC(1.7V)
AC(10V)
GND
JF04
TO CONTROL/DECODER (PU16)
-24.1V
DY61 S5688G
CY62 100/35V
CY63 100/35V
DY62 S5688G
CY61 0.022
RY62 10K
RY61 10K
CT-OUT
JY01
+5V
GND
LACH
ACK
SDIS
SCK
DAB
DAA
IR
NC
JF01
QY06~QY13
DTA114TS
QY06
QY07
QY08
QY09
QY10
QY11
QY12
QY13
QY01
UPD7537A
OUTPUT PORT 3
I/O PORT 10
OUTPUT PORT 8
OUTPUT PORT 9
I/O PORT 11
I/O PORT 0
I/O PORT 4
OUTPUT PORT 3
I/O PORT 5
128x4 BITS RAM
2048x8 BITS ROM
CPU
RESET
CL 1
CL 2
CLOCK & TIMING
VDD
VPRE
VLOAD
GND
CY11 100/16V
CY12 0.022
DY09 04AZ9.1
RY16 68K
CY07 4.7/50V
RY15 10K
RY17 10K
CY04 10/50V
DY08 1SS176
RY14 10K
XY01 590KHz
CY05 100P
CY06 100P
RY20 10K
RY19 10K
RY28 47K
RY27 47K
RY26 47K
RY25 47K
RY24 47K
RY23 47K
RY22 47K
RY21 47K
QY53
DTA114TS
QY51
2SA608SP
RY58 4.7K
DY51 1SS176
RY54 4.7K
RY51 1K
RY59 47K
CY52 47/16V
DY53 1SS176
DY52 1SS176
RY55 10K
RY53 22K
CY51 47/16V
QY52
DTC114TS
RY57 47K
RY56 1M
QY54
2SD1862 Q/R
RY18 2.2K
FL ON/OFF SW and MUTING
CY09 2200P
CY08 2200P
QY41 74HC595
8-BIT SERIAL/PARALLEL SHIFT REGISTER
SHIFT REGISTER
SHIFT SERIAL OUTPUT
RESET
LACH PARALLEL OUTPUT
OE
LACH
RY44 220
RY43 220
RY42 220
RY41 220
DY44 LT3D8B DISPLAY OFF
DY43 LT3D8B ERROR
DY42 LT3D8B FTS
DY41 LT3D8B REPEAT
QY45
QY44
QY43
QY42
QY42~QY45
DTC114TS
DY01 1SS176
DY02 1SS176
DY03 1SS176
DY04 1SS176
DY05 1SS176
SY01 REPEAT
SY02 FTS
SY03 OPEN/CLOSE
SY04 TRACK
SY05 TRACK
SY06 PAUSE
SY07 PLAY
SY08 DISPLAY
SY09 STOP
CY13 0.022
QY05 74HC164
8-BIT SERIAL/PARALLEL SHIFT REGISTER
CY01 0.1/50V
CY02 100/16V
RY01 100
RY02 100
RY03 100
ZY01
PAS-C0615
IR SENSOR
OUT

PY16 KEY-SENS/DISPLAY

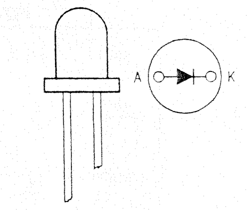

QY51
QY52 QY53
QY54 QY11
QY12 QY13
QY06 QY07 QY05
QY08 QY09
QY10
QY43 QY45
QY42 QY44
QY01 QY41
SY03 OPEN/CLOSE
SY06 PAUSE
SY07 PLAY
SKIP
STOP
SY04
SY05
SY09
SY08
DISP-OFF
JY02
GND
AC10V
AC17V
AC17V
VY01
VY02
ZY01
OUT
CY01
REPEAT
SY01
FTS
SY02
ERROR DY43
FTS DY42
REPEAT DY41
D-OFF DY44
QY41
QY01
QY05
XY01
DY61
DY62
CY61
CY62
CY63
CY73
CY13
CY02
DY04
DY03
DY05
CY41
CY09
DY01
DY02
JY01
NC
IR
DAA
DAB
SCK
SDI
ACK
LACH
GND
+5V
CY08
CY11
CY12
CY05
CY06
CY07
CY04
DY08
DY09
RY01
RY02
RY03
RY06
RY07
RY08
RY09
RY10
RY11
RY12
RY13
RY14
RY15
RY16
RY17
RY18
RY19
RY20
RY21
RY22
RY23
RY24
RY25
RY26
RY27
RY28
RY41
RY42
RY43
RY44
RY51
RY53
RY54
RY55
RY56
RY57
RY58
RY59
RY61
RY62
CY51
CY52
DY51
DY52
DY53


B
E
C
QY42~QY45
QY52

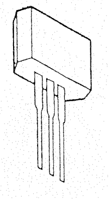

B
E
C
QY06~QY13
QY53



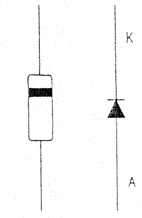
2SD1862
2SA608SP



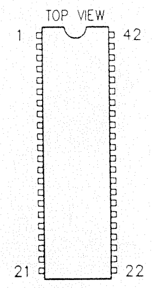
LT308B



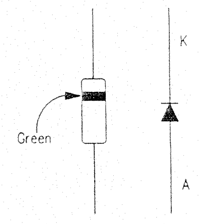
DTA114ES
DTA114TS



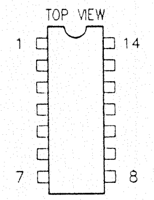
S5688G


TOP VIEW
1
42
21
22

UPD7537Y

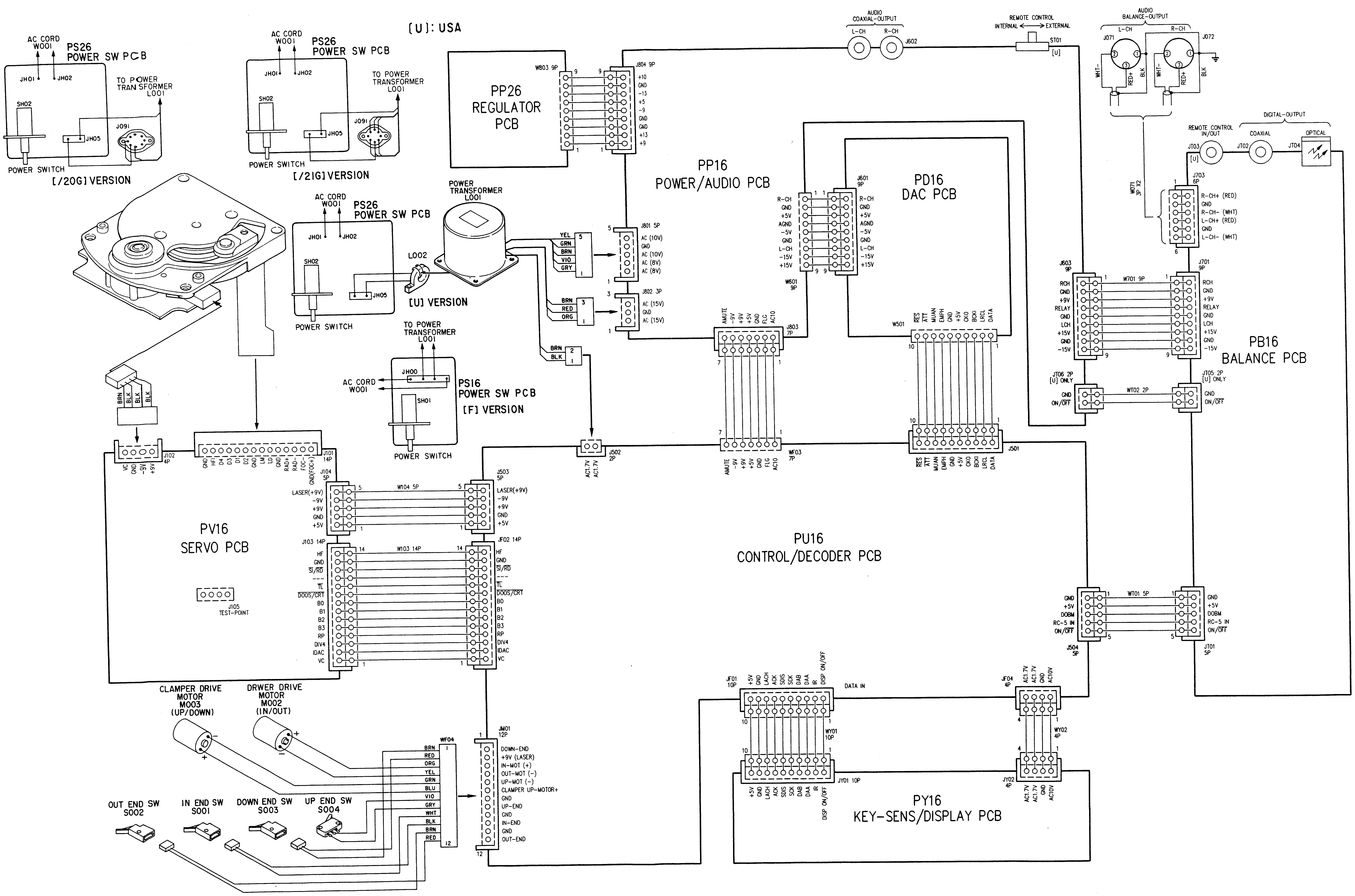


1SS176


TOP VIEW
1
14
7
8

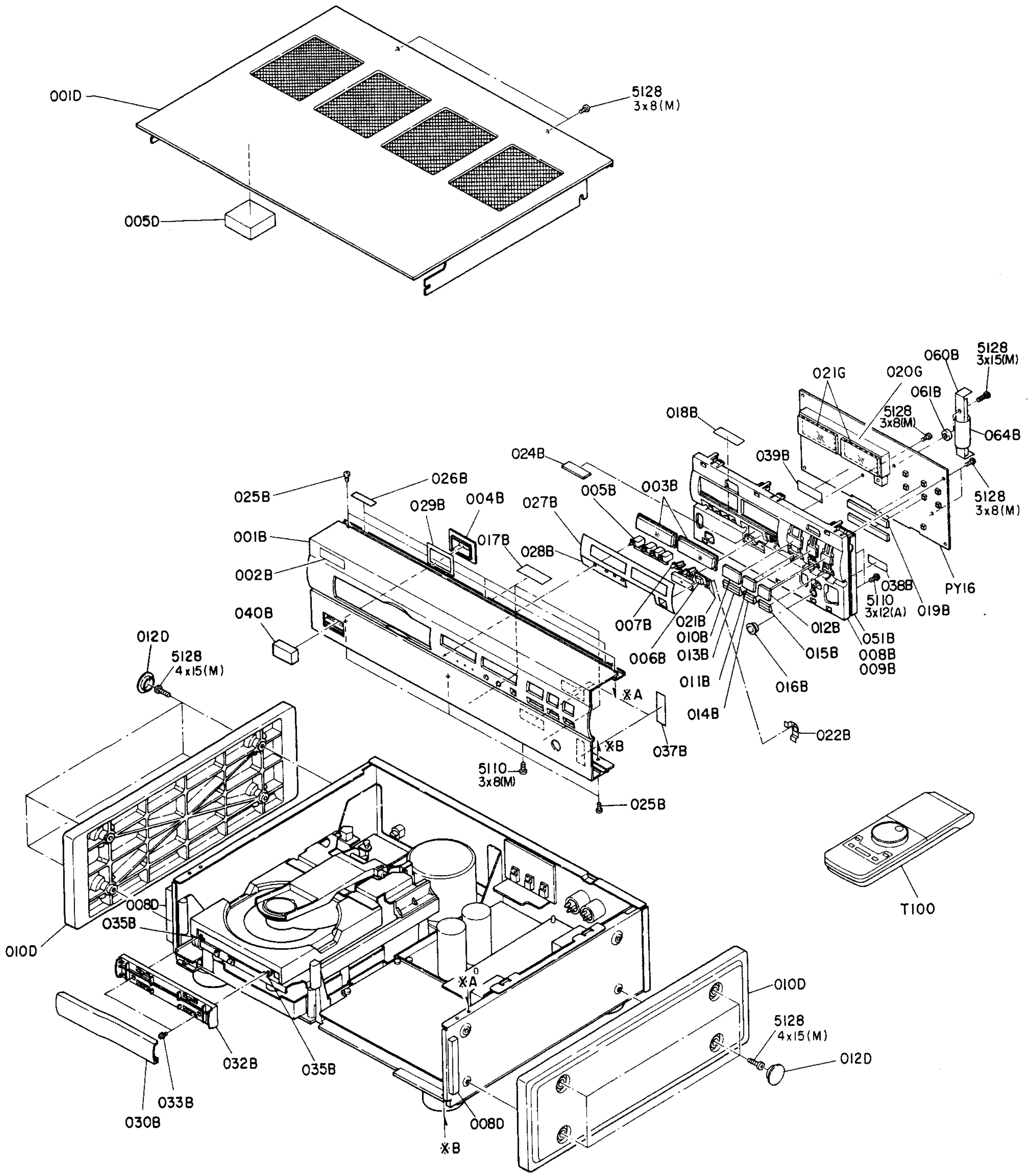
74HC164

6 CONNECTION DIAGRAM


[U]: USA
AC CORD W001
PS26 POWER SW PCB
JH01
JH02
SH02
TO POWER TRANSFORMER L001
J091
JH05
POWER SWITCH
[/20G] VERSION
[/21G] VERSION
L002
[U] VERSION
POWER TRANSFORMER L001
PS16 POWER SW PCB
[F] VERSION
JH00
SH01
PP26 REGULATOR PCB
W803 9P
J804 9P
+10
GND
-13
+5
-9
GND
GND
+13
+9
PP16 POWER/AUDIO PCB
J801 5P
AC (10V)
GND
AC (10V)
AC (8V)
AC (8V)
J802 3P
AC (15V)
GND
AC (15V)
YEL
GRN
BRN
VIO
GRY
RED
ORG
BLK
J803 7P
AMUTE
-9V
+9V
+5V
GND
FLG
AC10
PD16 DAC PCB
J601 9P
W601 9P
R-CH
GND
+5V
AGND
-5V
GND
L-CH
-15V
+15V
W501
RES
ATT
MUAN
EMPH
GND
+5V
CKO
BCKI
LRCL
DATA
AUDIO COAXIAL-OUTPUT
L-CH
R-CH
J602
REMOTE CONTROL
INTERNAL EXTERNAL
ST01
[U]
AUDIO BALANCE-OUTPUT
J071
J072
WHT-
RED+
BLK
REMOTE CONTROL IN/OUT
DIGITAL-OUTPUT
COAXIAL
OPTICAL
JT03
JT02
JT04
J703 6P
W071 3P X2
R-CH+ (RED)
GND
R-CH- (WHT)
L-CH+ (RED)
GND
L-CH- (WHT)
J603 9P
W701 9P
J701 9P
RCH
GND
+9V
RELAY
GND
LCH
+15V
GND
-15V
PB16 BALANCE PCB
JT06 2P [U] ONLY
WT02 2P
JT05 2P [U] ONLY
GND
ON/OFF
PV16 SERVO PCB
J102 4P
VC
GND
-9V
+9V
J101 14P
GND
HFI
D4
D3
D1
D2
GND
LM
LD
GND
RAD+
RAD-
FOC-
GND(FOC+)
J104 5P
W104 5P
J503 5P
LASER(+9V)
-9V
+9V
GND
+5V
J103 14P
W103 14P
JF02 14P
HF
GND
SI/RD

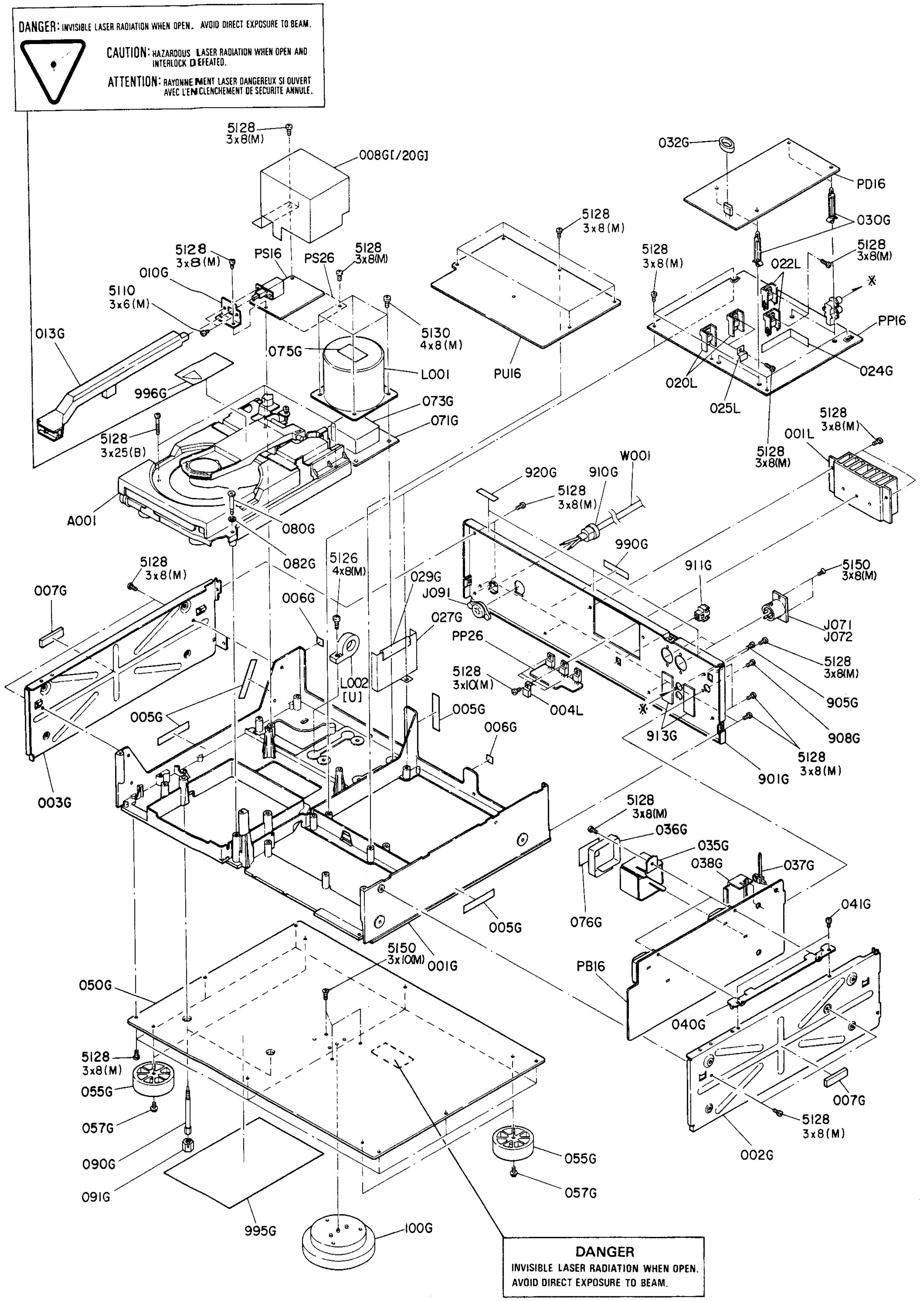
TL
DOOS/CRT
B0
B1
B2
B3
RP
DIV4
IDAC
VC
J105 TEST-POINT
J502 2P
AC1.7V
AC1.7V
WF03 7P
J501
PU16 CONTROL/DECODER PCB
WT01 5P
GND
+5V
DOBM
RC-5 IN
ON/OFF
J504 5P
JT01 5P
CLAMPER DRIVE MOTOR M003 (UP/DOWN)
DRWER DRIVE MOTOR M002 (IN/OUT)
WF04
JM01 12P
BRN
RED
ORG
YEL
GRN
BLU
VIO
GRY
WHT
BLK
BRN
RED
DOWN-END
+9V (LASER)
IN-MOT (+)
OUT-MOT (-)
UP-MOT (-)
CLAMPER UP-MOTOR+
GND
UP-END
GND
IN-END
GND
OUT-END
OUT END SW S002
IN END SW S001
DOWN END SW S003
UP END SW S004
JF01 10P
+5V
GND
LACH
ACK
SDIS
SCK
DAB
DAA
IR
DISP ON/OFF
DATA IN
JF04 4P
AC1.7V
AC1.7V
GND
AC10V
WY01 10P
WY02 4P
JY01 10P
JY02 4P
PY16 KEY-SENS/DISPLAY PCB

7 EXPLODED VIEW AND MECHANICAL PARTS LIST


001D
5128
3x8(M)
005D
060B
5128
3x15(M)
021G
020G
061B
5128
3x8(M)
018B
064B
024B
039B
5128
3x8(M)
025B
026B
029B
004B
027B
005B
003B
001B
017B
028B
PY16
002B
038B
5110
3x12(A)
019B
040B
007B
021B
012B
010B
051B
006B
013B
015B
008B
009B
012D
5128
4x15(M)
011B
016B
※A
014B
※B
037B
022B
5110
3x8(M)
025B
T100
008D
035B
010D
※A
010D
5128
4x15(M)
012D
032B
035B
033B
030B
008D
※B

[257K]

REF. DESIG.	PART NO.	DESCRIPTION
001B	4822 426 51529	FRONT PANEL
002B	4822 459 10972	BADGE
003B	4822 450 61571	WINDOW
004B	4822 402 50283	BUSHING, POWER SW.
005B	4822 466 70689	LENS, LED
006B	4822 381 11132	LENS, REMOTE
007B	4822 410 60727	BUTTON, FTS/REPEAT
008B	4822 410 61753	BUTTON
009B	4822 464 50892	CHASSIS, MOULD
010B	4822 410 60725	BUTTON, PLAY
011B	4822 410 60726	BUTTON, PAUSE
012B	4822 410 60738	BUTTON, OPEN/CLOSE
013B	4822 410 61749	BUTTON, STOP
014B	4822 410 61751	BUTTON, TRACK (PREV)
015B	4822 410 61752	BUTTON, TRACK (NEXT)
016B	4822 410 60737	BUTTON, DISPLAY
021B	4822 380 20372	REFLECTOR, IR
025B	4822 502 13636	PH. TAP. SCREW
030B	4822 454 40136	ESCUTCHEON, DRAWER
032B	4822 402 61334	RETAINER, DRAWER ESC.
033B	4822 502 13927	F.WASHER SCREW 3 x 8 (M)
040B	4822 410 60741	BUTTON, POWER
010D	4822 444 40395	SIDE PANEL
012D	4822 444 60607	CAP, SIDE PANEL
020G	4822 256 91868	HOLDER
		PACKING
001T	4822 736 21335	USER MANUAL CD-11MK2 [/20G]
J082	4822 321 22611	CONNECTIVE CORD, RCA AUDIO
J083	4822 321 22862	CONNECTIVE CORD, RCA GOLD 75 Ω DIGITAL
J084	4822 321 22863	CONNECTIVE CORD, CANNON-RCA
T100	4822 218 10444	UNIT K, IR COMANDER, RC-11MK2CD


DANGER: INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION: HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED.
ATTENTION: RAYONNEMENT LASER DANGEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE.
5128 3x8(M)
008G[/20G]
032G
PD16
030G
5128 3x8(M)
PS16
PS26
010G
5110 3x6(M)
013G
5130 4x8(M)
075G
L001
PU16
022L
PP16
024G
020L
025L
996G
073G
071G
5128 3x25(B)
001L
W001
920G
910G
A001
080G
082G
5126 4x8(M)
990G
029G
J091
911G
5150 3x8(M)
007G
006G
027G
PP26
J071
J072
5128 3x10(M)
L002 [U]
004L
005G
006G
905G
908G
913G
901G
003G
5128 3x8(M)
036G
035G
038G
037G
041G
076G
005G
5150 3x10(M)
001G
PB16
040G
050G
055G
057G
090G
091G
995G
100G
055G
057G
007G
002G
DANGER
INVISIBLE LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.

LASER RADIATION SAFETY

Protection of eyes from laser beam during servicing. This set employs a laser. Therefore, be sure to carefully follow the instructions below when servicing.

1. **Laser Diode Properties**
   - Material: Al Ga As
   - Wave Length: 0.78μm
   - Emission Duration: Continous
   - Laser Output: Max. 0.11 mW

   This output is the value measures at the objective lens surface on the light pen assembly.
   - Classification: Class IIIb

2. During service, do not take the subchassis block apart and do not adjust the H F amp circuit. If there is a breakdown in the H F circuit (including laser diode), replace the entire subchassis block (including H F amp circuit board).

WARNING!!

When servicing, do not approach the laser exit with the eye too closely.

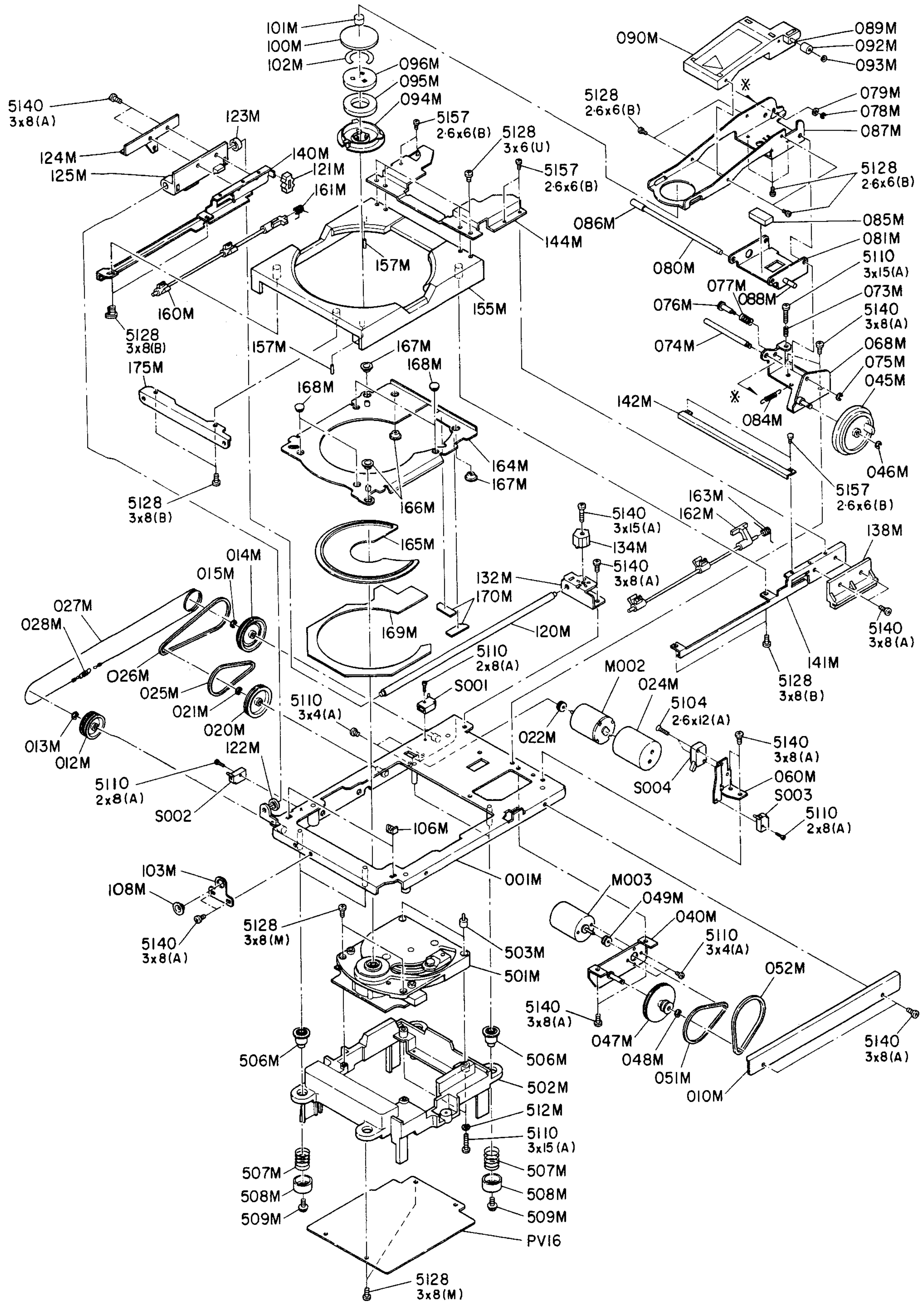
In case it is necessary to confirm laser beam emission, be sure to observe from a distance of more than 30 cm from the surface of the objective lens on the light pen assembly.

LASER WARNING LABELS

The labels shown below are affixed.

1) DHHS Protective housing label
   "DANGER – INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM."
2) DNHW Protective housing label and laser radiation sign label
   "CAUTION _ HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFETED."
   "ATTENTION _ RAYONNEMENT LASER DANGFEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE."

REF. DESIG.	PART NO.	DESCRIPTION
041G	4822 502 13636	PH.TAP.SCREW, 3 x 8 (M)
055G	4822 462 41336	LEG
057G	4822 502 12511	B. T. SCREW (W/W) 3 x 8 (M)
080G	4822 502 13925	SCREW 001G + A001 PIVOT
082G	4822 530 80667	WASHER
090G	4822 532 30508	SHAFT, TRANSPORT SCREW
091G	4822 462 71495	CAP, RED
905G	4822 502 13636	PH. TAP. SCREW 3 x 8 (M)
908G	4822 502 13636	PH. TAP. SCREW 3 x 8 (M)
910G	4822 325 50202	BUSHING, AC CORD
J071	4822 267 31466	PLUG, CANNON WITH GND (L-CH)
J072	4822 267 31466	PLUG, CANNON WITH GND (R-CH)
J091	4822 272 10236	VOLTAGE SELECTOR, 2POINT [/20G]
⚠ L001	4822 146 21549	POWER TRANSFORMER [/20G]
⚠ W001	4822 321 10804	A.C.POWER CORD [/20G]


101M
100M
102M
096M
095M
094M
5157 2·6x6(B)
5128 3x6(U)
5157 2·6x6(B)
5140 3x8(A)
123M
124M
125M
140M
121M
161M
157M
144M
155M
160M
5128 3x8(B)
157M
175M
167M
168M
168M
164M
167M
166M
5128 3x8(B)
165M
014M
015M
027M
028M
026M
025M
021M
020M
013M
012M
169M
170M
132M
120M
5110 2x8(A)
S001
5110 3x4(A)
122M
5110 2x8(A)
S002
106M
103M
108M
5140 3x8(A)
5128 3x8(M)
001M
503M
501M
506M
506M
502M
512M
5110 3x15(A)
507M
508M
509M
507M
508M
509M
PV16
5128 3x8(M)
090M
089M
092M
093M
5128 2·6x6(B)
079M
078M
087M
5128 2·6x6(B)
086M
085M
081M
080M
5110 3x15(A)
077M
088M
073M
076M
5140 3x8(A)
074M
068M
075M
045M
142M
084M
046M
5157 2·6x6(B)
163M
162M
138M
5140 3x15(A)
134M
5140 3x8(A)
5140 3x8(A)
141M
5128 3x8(B)
M002
024M
5104 2·6x12(A)
022M
5140 3x8(A)
060M
S004
S003
5110 2x8(A)
M003
049M
040M
5110 3x4(A)
052M
5140 3x8(A)
047M
048M
051M
010M
5140 3x8(A)
※
※

REF. DESIG.	PART NO.	DESCRIPTION
012M	4822 528 81163	PULLEY, WIRE WHEEL(FRONT)
013M	4822 532 11301	E RING FOR WHEEL(FRONT)
014M	4822 528 81387	PULLEY, WIRE WHEEL(REAR)
015M	4822 532 11301	E RING FOR WHEEL(REAR)
020M	4822 528 81238	PULLEY, (MIDDLE)
021M	4822 532 11301	E RING, FOR MIDDLE PULLEY
022M	4822 528 81166	PULLEY, MOTOR
025M	4822 358 30762	BELT, MOTOR
026M	4822 358 31065	BELT, TRAY DRIVE
028M	4822 492 33161	SPRING, WIRE TENSION
045M	4822 528 30392	CAM, CLAMPER DRIVE
046M	4822 532 11301	E RING, 045M + 070M
047M	4822 528 81164	PULLEY, CLAMPER MIDDLE
048M	4822 532 11301	E RING FOR MIDDLE PULLEY
049M	4822 528 81166	PULLEY, MOTOR
051M	4822 358 30762	BELT, MOTOR
052M	4822 358 30763	BELT, CAM DRIVE
073M	4822 492 70628	SPRING, DOWN ADJUSTER
075M	4822 532 11301	E RING, FOR BEARING SHAFT
077M	4822 492 70631	SPRING, L/R ADJUSTER
078M	4822 530 70122	E RING, FOR ADJUSTER END
079M	4822 532 52236	WASHER
084M	4822 492 70629	SPRING
092M	4822 528 90836	ROLLER
093M	4822 532 51467	STOPPER
094M	4822 526 20174	CLAMPER, MAGNET CASE
095M	4822 526 20173	MAGNET
096M	4822 528 90783	COVER
100M	4822 462 71811	BUFFER
101M	4822 462 71809	BUFFER
102M	4822 466 61927	BUFFER
106M	4822 256 91867	HOLDER, TRAY FRONT SUPPORT
108M	4822 532 30509	BUSHING, FRONT GUIDE
125M	4822 256 91196	HOLDER, SLIDE BEARING
155M	4822 444 50637	CASE, TRAY
161M	4822 492 70633	SPRING, TRAY LIFT LEFT
163M	4822 492 70632	SPRING, TRAY LIFT RIGHT
164M	4822 444 50635	TRAY, U/D DISC
165M	4822 444 50677	TRAY, SINGLE
501M	4822 691 30276	MECHANISM, CDM-4 MINI (DIECAST)
507M	4822 492 70625	SPRING
508M	4822 530 70561	RETAINER
509M	4822 502 13926	F. WASHER SCREW, 508M + 003M
512M	4822 530 80349	SPRING WASHER
M002	4822 361 60467	D.C.MOTOR, TRAY DRIVE
M003	4822 361 60447	D.C.MOTOR, CLAMPER DRIVE
S001	4822 277 21132	SLIDE SWITCH, TRAY IN END
S002	4822 277 21132	SLIDE SWITCH, TRAY OUT END
S003	4822 277 21132	SLIDE SWITCH, CLAMPER DOWN END
S004	4822 271 30712	MINI SWITCH, CLAMPER UP END

REF. DESIG.	PART NO.	DESCRIPTION

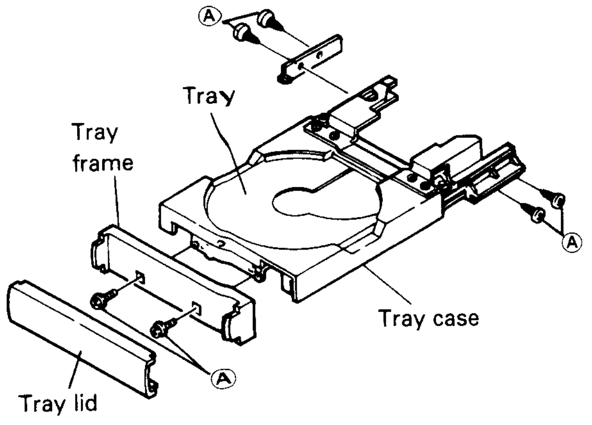
8 TRAY MECHANISM LOADING PROCEDURES

Cautions when servicing

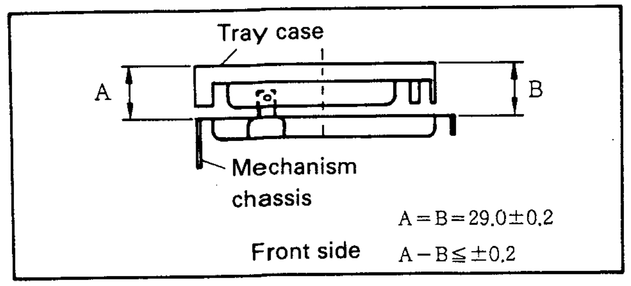
1. When mounting tray and tray case

(when replacing tray case because of damage etc.)

a) When the tray has been positioned improperly with a deviated clearance to the front panel window, remove the tray lid, loosen screws Ⓐ and adjust by moving the tray frame within the range of the holes play.

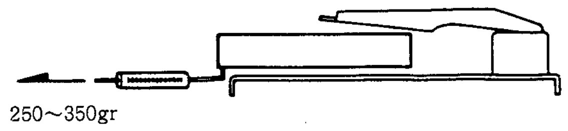

Ⓐ
Tray
Tray frame
Ⓐ
Tray case
Ⓐ
Tray lid

For the tray tilt adjustment, refer to the figure below.

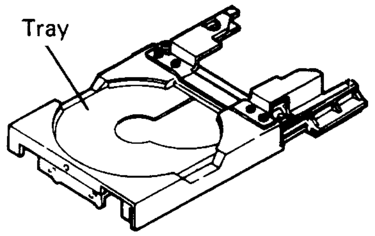

Tray case
A
B
Mechanism chassis
A=B=29.0±0.2
Front side
A−B≦±0.2

Adjust the tilt with screws Ⓐ.

b) The operating power of the tray is set to 250 - 350gr (Power OFF).



2. When the tray is disengaged to the lower side

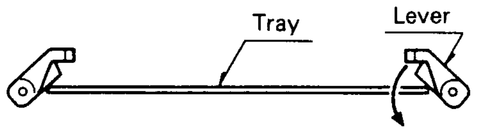


When the tray is pushed downward without the sub-chassis (CDM-4), it will be disengaged. So care will be necessary.

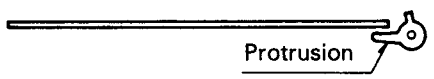
(Closing the tray without the sub-chassis also disengages the tray.)

Mount the tray referring to the figures below.

a) Bring down the lever and put the tray on the protrusion of lever.



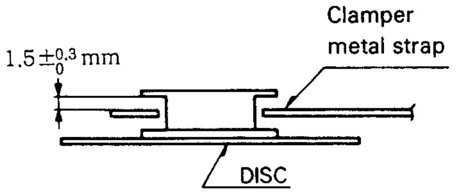
b) While holding the tray, bring down the opposite lever and put the tray on the protrusion of the lever.

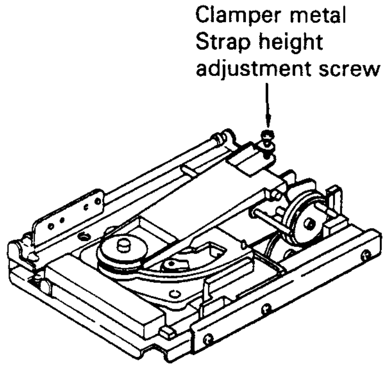

Protrusion

Note:
If both the levers are brought down at the same time, the tray cannot be raised. The levers should be brought down one by one.
If the tray is forced to move to the original position, the two pins injected into the tray case may be bent.

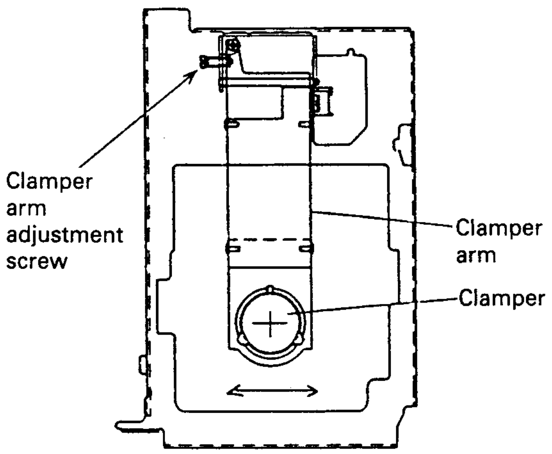
3. When replacing the sub-chassis (CDM-4)

a) The height of the sub-chassis turn table is different one by one. Adjust each turn table height so that the magnet clamper does not touch the clamper metal strap as shown in the figure.
Standard (1.5 $\pm^{0.3}_{0}$ mm)


Clamper metal strap
1.5 $\pm^{0.3}_{0}$ mm
DISC

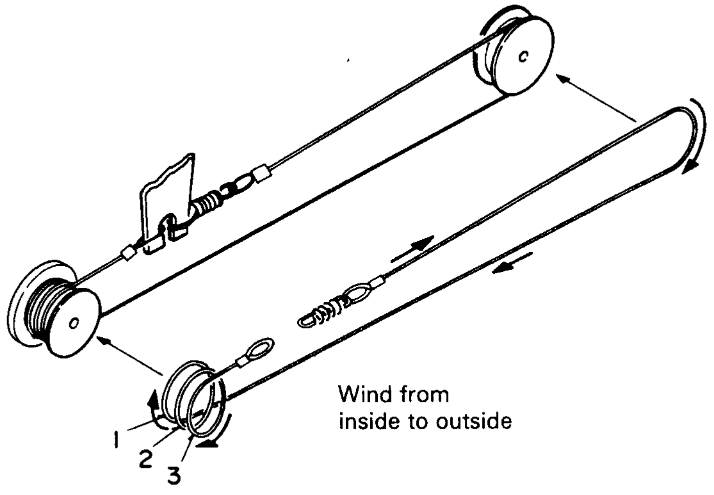

Clamper metal Strap height adjustment screw

b) After replacing the sub-chassis, readjust so that the magnet clamper does not touch the clamper metal strap at right and left sides. (The clamper metal strap should not be touched to other straps.)

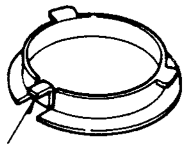

Clamper arm adjustment screw
Clamper arm
Clamper

4. Others

a) For the loading wire winding, refer to the figure below.


Wind from inside to outside
1
2
3

b) When the magnet clamper (094M) is replaced, bent the narrowest tab and remove the clamper.


Bend the narrowest tab.

9 PRACTICAL HINTS

Test discs

It is important that the test discs be treated with great care. The disturbances on the discs (black spots, finger-prints, etc.) are exclusive and are unambiguously positioned. Damages may cause extra drop-outs etc., thus putting an end to the exclusivity of the intentional error on the disc. In that case it is not possible anymore to check for example the good functioning of the track detector.

Measurements on op-amps

In the electronic circuits, op-amps have frequently been used.
The applications include amplifiers, filters, invertors and buffers.

In those cases where in one way or the other feedback has been applied, the voltage difference at the differential inputs converges to zero.
This applies to both DC and AC signals.
The cause can be traced to the properties of an ideal op-amp ($Z=\infty$, $G=\infty$, $ZO=0$).
If one input of an op-amp is directly connected to ground, it will be virtually impossible to measure at the inverting and non-inverting inputs.
In such cases only the output signal will be measurable.

That is why in most cases the AC voltage at the inputs will not be given.
The DC voltages at the inputs are equal.

Stimulating with "0" and "1"

To find a location of failure circuit it is sometimes necessary to connect certain points to ground or to a power supply voltage.
As a result certain circuits can be set to a desired state, thus saving the diagnosis time.
Generally, if the points are outputs of op-amps, specified dummies are used to connect the output to the ground.
As a result, the required check can be made with the circuit protected.

Measurements on microprocessors

Inputs and outputs of microprocessors should never be connected directly to the supply voltage.
The inputs and outputs should only be brought to "0" or ground if this is stated explicitly.

Measurements with an oscilloscope

During measurements with an oscilloscope it is recommended to use a 1:10 test probe, since a 1:10 probe has a considerably smaller input capacitance than a 1:1 probe.

Selection of the ground potential

It is very important to select a ground point that is as close as possible to the test point.

Conditions for injection

- Injection of levels or signals from an **external** source should **never** take place if the relevant circuit has no supply voltage.
- The injected levels or signals should **never** be greater than the supply voltage of the relevant circuit.

Indication of the test points

In the drawing of the diagrams and PCBs the test points are indicated by a number (e.g. ◇12) to which the measuring method refers.
In the following measuring method the symbol ◇ has been omitted for the test points indicated.

GENERAL CHECK POINTS

In the detailed measuring method below, a number of general conditions, required for a properly functioning set, will not be mentioned.
Before the detailed measuring method is started, these general points should be checked:

a. Ensure that the disc and objective are clean (remove dust, fingerprints, etc.) and use undamaged discs.

b. Check that all supply voltages are present and that they have the correct values.

Initiation of the service programme of the µP

For the initiation of the service programme of the µP, see Initiating the service programme.

SERVICING THE CDM UNIT

If the CDM is malfunction, replace whole, CDM unit.

10. INITIATING THE SERVICE PROGRAMME

The player can be brought in service position "0" to "3" whether the disc is put on the turntable or not. For the service position "2", the disc should be put on the turntable.

Service position "0"

- Press "STOP", "PLAY" and "FTS" simultaneously while switching on the mains voltage.
- The display shows:
  - The TRACK and INDEX field: LH -7
  - The MINUTES and SECONDS field: 05 0
- Fast CDM check:
  - With SEARCH keys " ◀◀ " and " ▶▶ " (Remote Control only) or with jog dial, check that the radial arm moves most outward and inward. (Service position "0" to "3")
  - Laser control in.
  - Check that the focus unit jumps over the tracks.

ATTENTION:
After the player is brought in service position "0" the laser remains driven until service position "3". Therefore, avoid direct exposure to the beam in service positions "0", "1" and "2".

Service position "1"

- Bring the player in service position "0".
  Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 05 1
- Functions:
  - Laser control in.
  - Focus start procedure is repeated unlimitedly. (If not, check SI/$\overline{\text{RD}}$ signal.)
  - With SKIP key " ▶▶| ", one can go back to service position "0".

Service position "2"

- Without a disc on the turntable:
  - Bring the player in service position "1" with the power turned off and the disc put on the turntable.
- With a disc on the turntable:
  - With SEARCH key " |◀◀ ", move radial arm most inward.
- Bring the player in service position "1".
- Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 05 2
- Functions:
  - Laser control in.
  - Focus control in.
  - Turntable motor control in.
  - Decoder IC generates MC signal.
  - With SKIP key " |◀◀ ", one can go back to service position "1".

ATTENTION:
When the radial arm is most outward with the disc on the turntable, the turntable (spindle motor) may turn reversely at high speed. In this case, with skip key bring the player in service position "1" or "3" from "2" immediately.

Service position "3"

- Bring the player in service position "2".
  Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 05 3
  - The set is the same condition as in STOP.
  - With SKIP keys " |◀◀ " and " ▶▶| ", one can go to service positions "3" to "0" and vice versa.

Service position "E"

- Bring the player in service position "3".
- Without a disc on the turntable:
  - Press "PLAY" key, and the display shows the same as when the power is turned on normally.
  - Set a disc with "OPEN/CLOSE" key, and TOC data is displayed.
- With a disc on the turntable:
  - Press "PLAY" key, and TOC data is read and displayed.
- Press "PLAY" key again, and the mode is changed to PLAY.
- Functions: all keys have their original functions. (including remote controller)
- If an error is detected, the player will stop and give an error indication on the display. For a description of the error indication: See Error table.
- If the μP observes a system error, a system error indication will appear on the display: Er 01 through Er 12.
- With any key pressed, system error mode (including error message) will be cleared. (With "PLAY" key, the PLAY mode will be brought again.)
- If the μP observes an operation error, an operating error indication will be displayed for 1.5 seconds:
  Er 30 through Er 56.

The service programme can be abandoned again by turning the mains switch (POWER ON/OFF) off and on again (Hardware reset).

The error message number will be displayed only in service programme. (In normal mode, "ERROR" indication will just appear.)

SEARCH " ▶▶ " = Forward search key
SEARCH " ◀◀ " = Reverse search key
SKIP " ▶▶| " = TRACK NEXT key
SKIP " |◀◀ " = TRACK PREV key

ERROR TABLE

System errors

Indication	Cause	Check
Er 01	No RD	Si, So, RD, Photodiode signal processor
Er 02	No $\overline{\text{TL}}$ pulse at start-up	$\overline{\text{TL}}$, HF, Photodiode signal processor, CD disc present
Er 03	No lead-in track found	CD disc, radial arm position, REdig, Radial error processor
Er 04	Too many $\overline{\text{TL}}$ pulses in PLAY	CD disc, HFD
Er 05	$\overline{\text{TL}}$ pulse > 50 msec. in PLAY	CD disc, HF in, photodiodes
Er 06	No $\overline{\text{TL}}$ pulse within 0.5 sec. during track jumping	RE-lag circuit
Er 07	Subcoding error during PLAY	HF
Er 08	TOC error	CD disc, turntable motor control, radial arm position
Er 09	EEROM sel error	Replace EEROM
Er 10	Search error; selected point on disc cannot be reached	CD disc
Er 11	ROM error	Replace ROM
Er 12	RAM in µP MC68HC11 defective	Replace µP MC68HC11

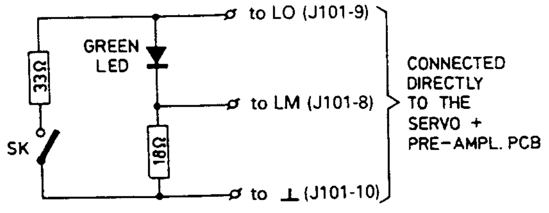
Operating errors

Er 30	“ ⏭ ” key operated during the last track, with Repeat turned off.
Er 31	“ ⏮ ” key operated during the first track, with Repeat turned off.
Er 32	Index selected before a track has been selected.
Er 34	The programme memory is full.
Er 35	The programme track is not present on this CD disc.
Er 36	Selected time in seconds greater than 59.
Er 38	Wrong time programmed.
Er 39	The selected track is not present on this CD disc.
Er 40	The selected track does not exist.
Er 41	FTS data storage error: memory full.
Er 42	FTS data storage error: no programme presented.
Er 43	FTS data storage error: no more disc number.
Er 44	FTS playback error: no FTS programme in the memory.
Er 45	FTS selection error: “ ⏭ ” key actuated while FTS points towards end of the number of tracks.
Er 46	FTS selection error: “ ⏮ ” key actuated while the FTS points to the beginning of the number of tracks.
Er 47	FTS selection error: “ ⏭ ” or “ ⏮ ” key actuated at the moment the µP is storing data.
Er 48	FTS selection error: “ ⏪ ” key actuated while the CD disc has not yet been stored in the FTS memory; or TOC of the disc has not yet been read in.
Er 49	FTS selection error: “ ⏩ ” key actuated.
Er 50	FTS clear error: “CANCEL” key actuated while data are being stored in the memory.
Er 51	“CANCEL” key actuated, but clear function has not been carried out.
Er 52	FTS data storage error: TOC of the CD disc, of which data should be saved, has not yet been read in.
Er 53	FTS playback error: Insufficient data of the TOC of the CD disc read in for processing in the FTS memory.
Er 54	“A – B” key actuated while the player was not in PLAY mode.
Er 55	“SEARCH” key actuated during Skip mode.
Er 56	End of the “FAST FORWARD or FAST REVERSE” search motion.

11. MEASUREMENTS AND ADJUSTMENT FOR CDM4 (SUB CHASSIS)

Check of the laser supply

The laser circuit generates a laser beam with LO signal at pin 17 of Q101, and the monitor diode makes LM signal. These circuits constitutes a feedback system and controls the laser output.
If, in that case, the laser (= complete CDM unit) is replaced, the new laser will also become defective.
However, it is impossible to check and repair a feedback system if a link is missing. For this reason the laser supply can be checked with the circuit below. The green LED replaces the laser, the voltage across the 18-Ohm resistor is fed back as monitor voltage, the 33-Ohm resistor and the switch serve to draw more current from the laser supply.



LED GREEN e.g. COY 94 IV 5322 130 32182

The above circuit is connected to connector J101 via an extension cable instead of flex print. The normal flex print is not suited for this purpose because of its high internal resistance.

Code no. extension cable 4622 322 40066

- The above flex print out of connector J101 on the servo + pre-amplifier PCB.
- Connect the circuit via the extension cable to connector J101.
- Select the play mode and $SI/\overline{RD}$ (pin 6 of Q101) will be "high".
- Measure the voltage LO (Laser Out) at test point 11.
  Note:
  $SI/\overline{RD} = 0$, start initialization "high", is the play mode.
  At $SI/\overline{RD}$: "low", in the STANDBY state, LO = 0 V ± 0.2 V.

SK open: 1.8 V < LO < 2.3 V
170 mV < LM < 220 mV
The green LED emits little light.
SK closed: 1.8 V < LO < 2.3 V
170 mV < LM < 220 mV
The green LED emits little light.

- During the change-over from SK closed to SK open, the LED will emit more light for a short moment.
- The control sees to it that the same amount of current flows through the LED when SK is open and when SK is closed.

Repair procedure

Since laser, monitor diode and photodiodes are very sensitive to static charges, care should be taken that during measurements and adjustments the aids and yourself have a potential that is equal to that of the CD mechanism.

Laser adjustment for CDM4

- Measure the resistance of R108 + R134 with an ohmmeter and adjust potentiometer R134 so that R134 + R108 have a combined value of 1 kΩ.
- Check the monitor diode connections. Measure at test point 11 and ground (⊥).
- Put test disc "5" on the turn table.
- Switch on the set and select the PLAY mode or a similar service position.
- Take a DC voltmeter and measure across R116.
  The voltage across this resistor should **stay smaller than 1260 mV.**
- Check if HF is present. If not, stop the measurement immediately and analyze the fault.
- If HF is present, play track no. 1 of test disc "5" and adjust R134 (4.7 k) so that the sum of HF across R114 (test points 1 and 2) becomes 50 mV ± 2 mV with a DC voltmeter.
  Check, during the adjustment, that the voltage across R116 does not exceed 1260 mV.
- If the adjustment is not successful within the 1260 mV margin across R116, check the angle setting.

Adjustment of the focus off-set (FE-lag)

- **Coarse adjustment**

A - Place potentiometer R136 approximately in mid-position.
- Put test disc "5" on the turntable.
- Bring the player in service position "2".
- The focussing motor can now start focussing. Check that the disc is moving.

B - Place with potentiometer R136 (Focus Offset) the focussing motor in optical horizontal position.
- Hereafter the fine adjustment of the focus offset has to be carried out.

- **Fine adjustment**

- Bring the player in service position "2".
- Adjust potentiometer R106 (Focus Offset) for a voltage across R106 (test point 27) of 400 mV ± 40 mV.

Note:
Notice that CDM is in a horizontal position.

12. DETAILED MEASURING METHOD FOR THE SERVO + PRE-AMPLIFIER CIRCUIT

PHOTODIODE SIGNAL PROCESSOR IC (Q101)

- **Check the SI/$\overline{\text{RD}}$, LO, LM signals**

  SI/$\overline{\text{RD}}$ (pin 6; test point 24)
  LO (pin 17; test point 11)
  LM (pin 18; test point 13)

- With the SI/$\overline{\text{RD}}$ signal (= Start Initiation) the laser supply, among other things, is switched on.
  When the SI/$\overline{\text{RD}}$ signal is "high", the LO signal (= Laser Out) should be "high".
  Via the LM signal (= Laser Monitor) the power supply for the laser diode is controlled.

Position of Player	POWER ON	Service position "1"	PLAY
SI/$\overline{\text{RD}}$ signal	"low"	∗ "high"	"high"
LO signal	"low"	"high"	"high"

∗) "low" pulse when focussing starts

- **Check the FE signal**

  FE (pin 15; test point 19)

- The FE signal (= Focus Error) is used to drive the focusing unit.
  When the SI/$\overline{\text{RD}}$ signal goes "low" pulse, the focal point will be searched for.
- When the player is brought into service position "**1**", the objective will search for the focal point. At test point 19 the FE signal varies between +1.5 V and -1.5 V.
- When the player is brought into service position "**2**" (with disc on turntable), the FE signal ensures that the laser spot stays in focus. If an error signal is injected, the FE signal will correct.
- Inject successively a voltage of +5 V and -6 V (= +5B and -6B) via a 200 kΩ resistance to test point 25 and check the FE signal.

Signal injected : testpoint 25	+ 5V	- 6V
FE signal : test point 19	negative	positive

- **Check the FE lag**

  FE lag (pin 16; test point 22)

- **See adjustment of the focus off-set.**

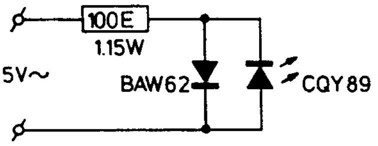
- **Check the D1 to D4 signals**

  D1 (pin 23; test point 6)
  D2 (pin 22; test point 4)
  D3 (pin 24; test point 7)
  D4 (pin 25; test point 8)

- The signals D1 to D4 are the error signals from the photodiode circuits.
- When in service position "**2**", the focusing unit should keep in track.
  When the disc is moving, there should be a changing signal on test points 4, 6, 7 and 8.

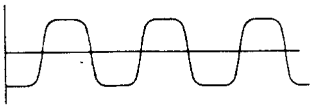
- **Check the photodiodes**

  Connected the circuit below to an alternating voltage of 17.5 V.



100 Ω, 1.15W	- 4822 116 51098
BAW 62	- 4922 130 30613
CQY 89	- 4822 130 31332

Switch on the supply voltage (17.5 V) and bring the player in the stand-by mode or in service position "**0**".
In this measurement, infrared diode CQY89 replaces the function of the laser diode.
When this diode is held above the objective unit, the infrared light falls on the 4 photodiodes.
When the 4 photodiodes are functioning, the following voltage form will be visible on test point 4, 6, 7 and 8 on the servo + pre-amplifier PCB.
(The amplitude depends on the distance between the IR diode and the objective).



Position of the oscilloscope: 100 ms/div.

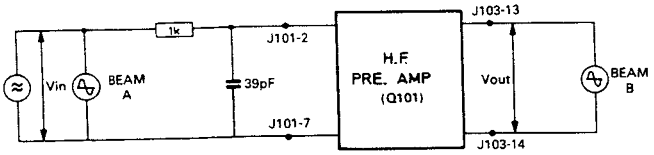
- **Check the HF-in signal**

HF-in (pin 26; test point 3)

- The HF-in signal (= High Frequency in) is the information signal from the 4 photodiodes.

- **Check the HF amplifier in Q101**

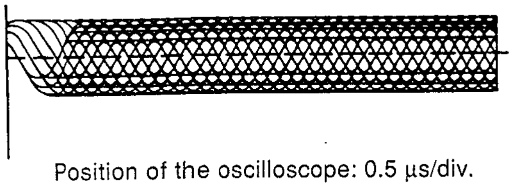
- Take the flexible PCB out of connector J101.
- Switch on the supply voltage.
- Inject a signal V-in of about 10 mVpp, 50 kHz, via the RC network, between connector pin J101-2 and connector pin J101-7 according to the diagram below.
- The output voltage (Vout) between connector pins J103-13 and J103-14 should be about 1 Vpp.



- **Check the HF-out signal**

HF-out (pin 3; test point 21)

- The HF-out signal (= High-Frequency out) is the amplified information signal for the decoder circuit. During playback of test disc "**5**" (4822 397 30098), a so-called "eye pattern" should be present on test point 21 (see figure below).
- The HF signal should be present and stable in the PLAY mode and in service position "**E**" after the lead-in track has been read. In service position "**2**" and during the reading of the lead-in track, the HF signal is present, but is not stable.



Position of the oscilloscope: 0.5 µs/div.
Amplitude: about 1.5 Vpp

- **Check the DET, $\overline{\text{TL}}$ signals**

DET (pin 4)
$\overline{\text{TL}}$ (pin 11; test point 9)

- The DET signal (= Detector) gives information on the level of the HF signal to the high-frequency Level/ Drop-out detector of Q101.
- The $\overline{\text{TL}}$ signal (=Track Lost) will then go "low" in order to tell the servo µP that the tracking signals are unreliable.

Method:
(Can only be used in a playing set).

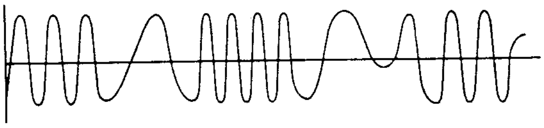
- Put test disc "**5A**" (4822 397 30098) on the turntable.
- When track number 10 or 15 is played, the drop-out pulses will be present on the DET signal (pin 4). (Position of oscilloscope: 2 ms/div.)

When the disc is slowly braked by hand, $\overline{\text{TL}}$ pulse will be visible at test point 9. ("low" pulse or "low")

- **Check the RE1, RE2 signals**

RE1 (pin 21; test point 14)
RE2 (pin 20; test point 16)

- Signals RE1 and RE2 (= Radial Error) are the control signals for the arm during tracking.
- In service position "**2**", the following signals should be visible at test point 14 and 16.



Position of the oscilloscope: 2 ms/div.
The frequency strongly depends on the eccentricity of the disc.

- **Check the $\overline{\text{DODS}}/\overline{\text{CRI}}$ signals**

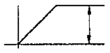
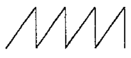
$\overline{\text{DODS}}/\overline{\text{CRI}}$ (pin 12; test point 18)

The $\overline{\text{DODS}}$ signal (=Drop Out Detector Suppression) avoids that Drop-Out signals influence the arm control during tracking jumping. ("low" in jumping)

Position of Player	Power ON	Service position "E"	Play	Search pause
$\overline{\text{DODS}}/\overline{\text{CRI}}$	"low"	"high"	"high"	"low" pulse

- **Check the SC (= Start Capacity) signal**

SC (pin 5; test point 26)

Position of player	SC (pin 5)
POWER ON	 4V
PLAY	+ 5V
Service position "1"	∗  4V

∗) Repeats for focusing.

- **Check the FE lag signal**

FE lag (pin 16, test point 22)

- In service position "**2**", "**E**" and in the PLAY mode, a voltage of about 400 mV (Focus Offset voltage) is present at this point.
See adjustment of the focus off-set.

RADIAL ERROR PROCESSOR IC Q103

Check the signals coming from the servo µP and from photodiode signal processor Q101.

- **Check the RE-dig signal**

  RE-dig (RP) (pin 7; test point 31)

- With the RE dig signal (= Radial Error digital = Radial Polarity), the movement of the arm is controlled/corrected in case of track jumping and bumping against the player.
- In service position "E" or in the PLAY mode a square wave should be present at test point 31.
  Because of frequency variations this square wave is hard to trigger.
- In the positions "⏮" and "⏭" SKIP keys, the frequency of the square wave decreases.

- **Check the RE signal**

  RE (pin 15; test point 36)

- With the RE signal (= Radial Error) the light spot is kept on the track.
  When an error signal is injected, the RE signal will correct.
- Bring the player in service position "E".
- Inject successively a voltage of +5 V and -6 V (= +5B and -6B), via a 120 kΩ resistance, to ICQ106 and check the RE signal.

Signal injected testpoint 38	+ 5V	- 6V
RE signal: test point 36	negative	positive

- **Check the RE-lag signal**

  RE lag (pin 18; test point 42)

Capacitor C121 in the RE-lag circuit has a memory function.

- It memorizes the degree of inclination of the disc.
- When a jump is made to a certain track on the disc, the memory should be cleared.
- This takes place by the decoder µP (QF02, B0 to B3) via ICQ103.
- During track jumping (SEARCH), slow pulses should be visible at test point 42 (position of the oscilloscope 0.1 ms/div.).

- **Check the RE1, RE2 signals**

  RE1 (pin 21; test point 14)
  RE2 (pin 20; test point 16)

- **See measuring method of RE1 and RE2.**

- **Check the B0 to B3 signals**

  B0 (pin 11; test point 37)
  B1 (pin 10; test point 38)
  B2 (pin 9; test point 41)
  B3 (pin 8; test point 39)

- With the B0 to B3 signals;
  the radial control is switched on and
  the level on the DAC output is controlled.
- Depending on the SEARCH directions "◀◀", "▶▶" and total operation modes of 4, B0 to B3 signals become as shown below.

	STOP	PLAY	Service position "0", "1", "2"	
			"◀◀" search	"▶▶" search
B0	"low"	"high"	"low"	"low"
B1	"high"	"high"	"high"	"high"
B2	"high"	"high"	"high"	"low"
B3	"high"	"low"	"high"	"high"

- **Check the VC signal**

  VC (connector point J102-1; test point 83)

- Place a disc on the turntable. The voltage at connector point J102-1 will be about Vc: -1.7 V < Vc < 0 V during playback.

13 DETAILED MEASURING METHOD FOR THE DECODER CIRCUIT

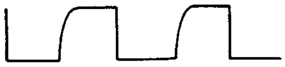
DECODER IC (Q501)

- **Check the MC signal**

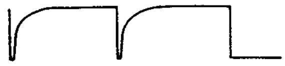
MC (pin 24; test point 74)

The MC signal is used to control the speed of the turntable (spindle motor).

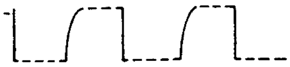
- In stand-by mode, the MC signal (Motor Control) corresponds to the figure below.
  Note:
  The repetition time of the MC signal is 11.3 μsec.
- Place a disc on the turntable.
- In position PLAY or service position **"E"**, the MC signal corresponds to the figure below.
  Note:
  During start-up the duty cycle is 98 %, then the duty cycle of the signal becomes about 50 %.



Standby mode



At start



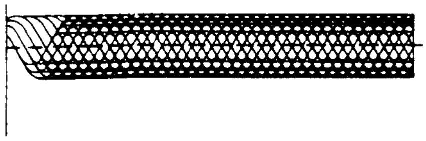
When reaching the normal speed

- **Check the HF signal**

HF (eye pattern; test point 61)

- Place a disc on the turntable.
- When reading of the lead-in track is completed in the PLAY mode or in service position **"E"**, normal HF signal becomes the eye pattern as shown below.
  Note:
  In service position **"2"** or during reading of the lead-in track the HF signal is not stable.

Amplitude ≈ 1.5 Vpp (eye pattern)



- **Check the Xin signal**

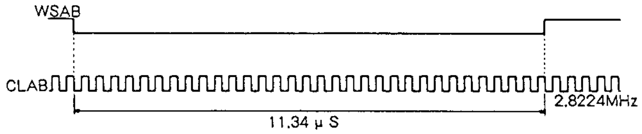
Xin (pin 26; test point 77)

- The Xin frequency is 11.2896 MHz.
- If this frequency deviates, check XIN (pin 9) on ADOC IC (Q504). This frequency should also be 11.2896 MHz.

- **Check the timing signals meant for Filter IC (Q502)**

WSAB(pin 4; test point 78)
CLAB (pin 3; test point 79)
DAAB (pin 2; test point 81)

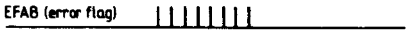
- Place a disc on the turntable.
- Service position **"E"** or PLAY mode.
- Trigger the oscilloscope with the WSAB signal.
- Check the interrelation between the WSAB signal and the CLAB signal.
- The DAAB signal being sent to the Delay IC (Q565) can be observed by triggering the oscilloscope with the WSAB signal. (The data waveform is not stable.)



- **Check the EFAB signal**

EFAB (pin 1; test point 66)

- Place test disc **"5A"** on the turntable.
- During playback, EFAB pulses should be present at test point 66 for soft braking of the disc and during fast search (F. Forward, F. Reverse).

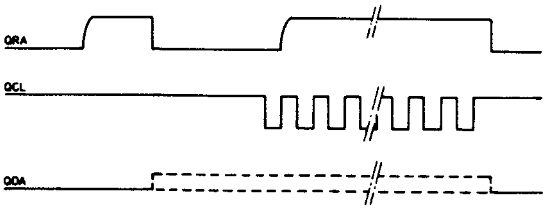


- **Check the Q-channel signals**

QRA (pin 38; test point 62)
QCL (pin 40; test point 63)
QDA (pin 37; test point 64)

- Place a disc on the turntable.
- Service position **"E"** or PLAY mode.
- Trigger the oscilloscope with the QRA signal (Q-channel Request Acknowledge).
- Check the interrelations of QRA and QCL (Q-channel-clock) signals between the master μP (QF01).
- If they are normal, check the QDA signal (Q-channel Data).

Note:
The QRA request is initiated by QF01 (QRA "high"). Then Decoder-A answers this request (QRA goes "low"). With the next leading clock pulse (QCL) the QRA signal is rendered "high" again by the QF01. As soon as the Decoder-A has taken in enough information via QDA, QRA will go "low" again. That is why the QRA times vary each time.



- **Check the SWAB/$\overline{\text{SSM}}$ signal**

SWAB/$\overline{\text{SSM}}$ (pin 42; test point 65)

- Motor start pulse when test point 65 is "high" for ≤ 0.2 sec.
- Motor stop pulse when test point 65 is "low" for ≤ 0.2 sec.

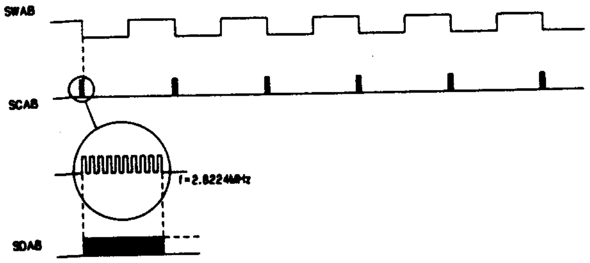
Note:
After the motor start pulse goes "high", SWAB information (Subcoding Word clock) will become visible at this point. The period time of that signal is 136 μsec (7.35 kHz).

- **Check the subcode clock signals**

SWAB/$\overline{\text{SSM}}$	**(pin 42, test point 65)**
SCAB	**(pin 44, test point 70)**
SDAB	**(pin 43, test point 68)**

- Place a disc on the turntable.
- Service position "**E**" or PLAY mode.
- Trigger the oscilloscope with the SWAB signal at test point 65.
- Check the SCAB signal (Subcode Clock).
- Check the SDAB signal (Subcode Data).
- Check that the signals above are sent to ADOC (DIGITAL OUT) IC (Q504) without interruption. However, they go "low" at PAUSE/STOP mode.

Note:
While the burst of 10 clock pulses appear on SCAB, the Q-channel information is transferred on SDAB. Hereafter the P-bit indication follows.
The P-bit is "high" between two bursts of 10 clock pulses in case of pause indication and "low" in case of music indication.



- **Check the $\overline{\text{DODS}}$/$\overline{\text{CRI}}$ signal**

$\overline{\text{DODS}}$/$\overline{\text{CRI}}$ (pin 36; test point 18)

The $\overline{\text{CRI}}$ signal (Counter Reset) goes "low" in track jumping and the signal makes the internal counter to free-running status. (See PHOTODIODE SIGNAL PROCESSOR IC (Q101), Check the $\overline{\text{DODS}}$/$\overline{\text{CRI}}$ signal section.)

- **Check the $\overline{\text{DEEM}}$ signal**

$\overline{\text{DEEM}}$ (pin 41; test point 69)

- Place test disc "**5**" on the turntable.
- During playback of track number 15, the $\overline{\text{DEEM}}$ signal should be "high". (DE-EMPHASIS ON)

ADOC IC (Q504)

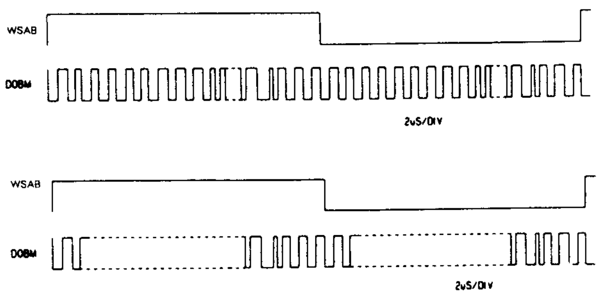
This IC (ADOC: Audio Digital Output Circuit) generates the DOBM signal out of the I ^{2}S data and subcode data.

- **Check the WSAB, DOBM signals**

WSAB (pin 1; test point 78)
DOBM (pin 13; test point 85)

- Place a disc on the turntable.
- STOP mode or PLAY mode.
- Trigger the oscilloscope with the WSAB signal.
- Check the DOBM signal.

Note:
As shown below, the DOBM signal makes a pattern when an audio signal enters, but the data section of the DOBM signal is not specified when the audio signal does not enter.



CHECK THE $\overline{\text{ATSB}}$, $\overline{\text{MUSB}}$ SIGNALS

$\overline{\text{ATSB}}$ (QF02, pin 20; test point 57)
$\overline{\text{MUSB}}$ (QF02, pin 21; test point 58)

- The $\overline{\text{ATSB}}$ signal goes "low" during searching with attenuation (−12 dB) in.
- The $\overline{\text{MUSB}}$ signal goes "low" during PAUSE, SKIP, and track jumping with mute in.

FILTER IC (Q563)

- **Check the signals between Decoder IC and Filter IC**

WSAB	**(W501-pin 2; test point 78)**
CLAB	**(W501-pin 3; test point 79)**
DAAB	**(W501-pin 1; test point 81)**
LRCI/WSAB	**(pin 28; test point 78)**
BCKI/CLAB	**(pin 2; test point 88)**
DIN	**(pin 1; test point 89)**

The DAAB, CLAB, WSAB signals are output from Decoder IC (Q501) in I^{2}S format. A format conversion is required for inputting these data into the Filter IC (Q563). For this purpose, the DAAB signal is delayed by 16 bits with the CLAB clock in the Shift Register IC (Q565, Q566). As a result, the delayed DAAB signal from pin 13 of IC566 is input to Filter IC (Q563). (See the timing chart.)

- **Check the Filter IC signals**

WCKO/WSI (pin 25; test point 95)
BCKO/SCKI (pin 26; test point 92)
DOL/SDI1 (pin 24; test point 93)
DOR/SDI2 (pin 23; test point 94)

This IC converts 16-bit data to 8 times oversampling 20-bit data and outputs Lch and Rch data simultaneously. (See the timing chart.)

- Put a disc on the turntable.
- Service position "E" or PLAY mode.
- Trigger the oscilloscope with the WCKO/WSI signal.
- Check the signals above.

- **Check the other signals**

MUT (pin 15; test point 15)
DEEM/DIEM (pin 16, test point 69)

- The MUT signal is the inverted signal of the $\overline{\text{MUSB}}$. (Q567-5/6)
  When the MUT signal goes "high", mute is in.
- When the DEEM/DIEM signal goes "high", digital de-emphasis is in.

CONTROL IC (Q562)

This IC is the µP used for controlling the Filter IC (Q563). When the supply voltage is applied, MS1, MS2, MS3, MDT and $\overline{\text{MEN}}$ of 5-bit signal complete the initial setting (16-bit input, 20-bit output, noise shaper ON) etc. of Filter IC (Q563).
After the initial setting is completed and when the $\overline{\text{ATSB}}$ signal goes "low", above control bits (MS1 to MS3, MDT and $\overline{\text{MEN}}$) command the Filter IC (Q563) to develop attenuation (–12 dB).

BITSTREAM CONVERSION SYSTEM

- **Check the BS DAC SAA7350 (Q561)**

XSYS2 (pin 43; test point 101)
DOL (pin 42; test point 102)
DOR (pin 44; test point 103)

Though this IC is a bit stream type conversion DAC, the D/A conversion is not made here.
In this IC, 8 times oversampling 20-bit data becomes a noise shaped 1-bit (PDM) 128fs (8fs x 16) data, and sent simultaneously to Lch and Rch. (See the timing chart.)
With these XSYS2, DOL and DOR signals, non-inversion and inversion processes are carried out in D-F. F. IC (Q564) and each of them is sent to respective DAC.

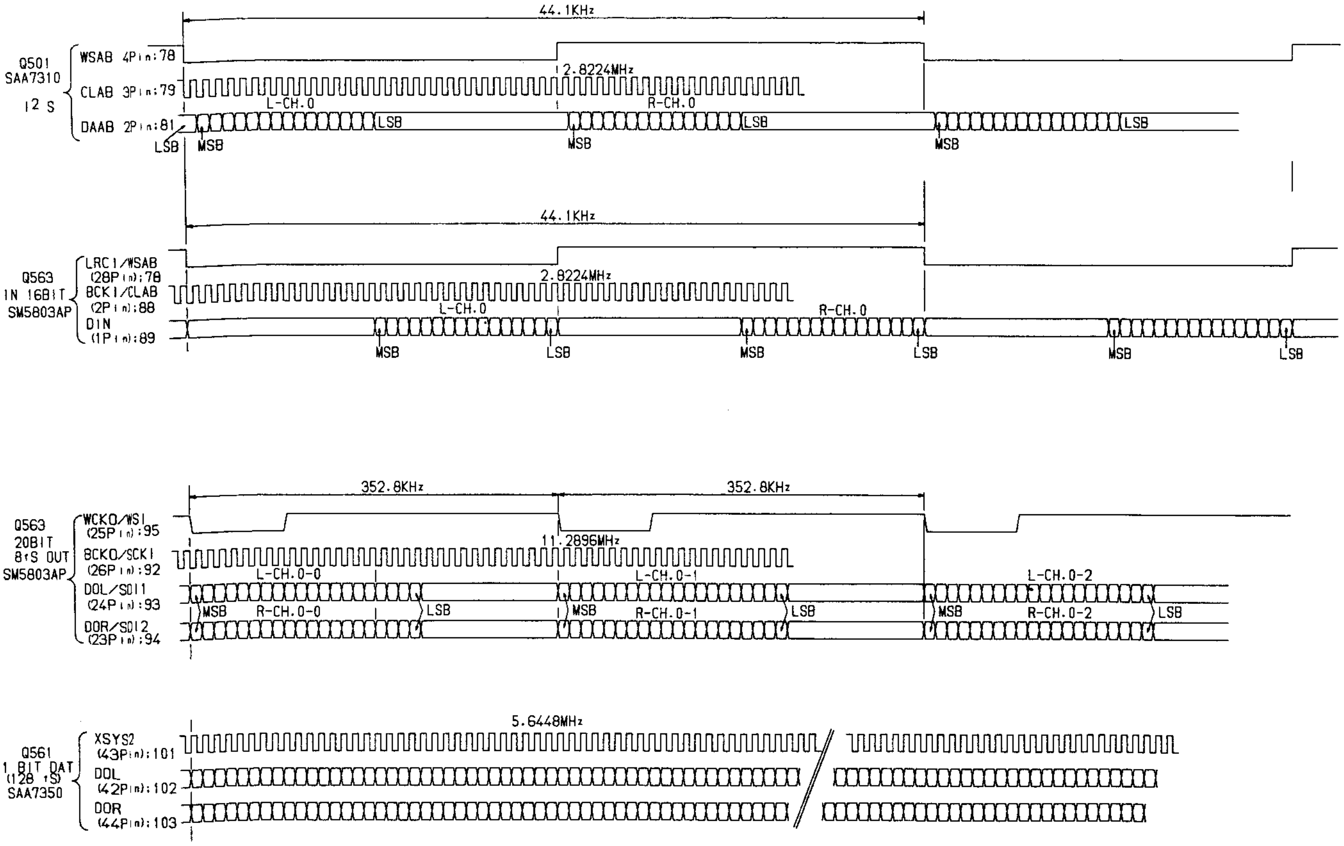
- **1 BIT DAC: DAC7 (QD01, QD02)**

The 1bit (PDM) non-inverted or inverted data makes D/A conversion with switched capacitors and op-amps inside the IC.
As a result, Lch (QD01) and Rch (QD02) become double differential type outputs.
(This cancels in-phase noises, decrease THD and improves separation and distortion factors in low frequency range.)

- **After DAC**

The audio signals are output through the double differential stages (Q601 to Q604), LPFs (Q605, Q606) and the unbalance or balance circuits.

Timing chart


44.1KHz
Q501
SAA7310
I2S
WSAB 4Pin:78
CLAB 3Pin:79
DAAB 2Pin:81
2.8224MHz
L-CH.0
R-CH.0
LSB
MSB
Q563
IN 16BIT
SM5803AP
LRCI/WSAB (28Pin):78
BCKI/CLAB (2Pin):88
DIN (1Pin):89
352.8KHz
11.2896MHz
Q563
20BIT
8fS OUT
SM5803AP
WCKO/WSI (25Pin):95
BCKO/SCKI (26Pin):92
DOL/SDI1 (24Pin):93
DOR/SDI2 (23Pin):94
L-CH.0-0
L-CH.0-1
L-CH.0-2
R-CH.0-0
R-CH.0-1
R-CH.0-2
5.6448MHz
Q561
1 BIT DAT
(128 fS)
SAA7350
XSYS2 (43Pin):101
DOL (42Pin):102
DOR (44Pin):103

14 ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTOR

R*:** (1) GD05---140, Carbon film fixed resistor, ±5%, 1/4W

R*:** (2) GD05---160, Carbon film fixed resistor, ±5%, 1/6W

① — Resistance value

Examples

① Resistance value

0.1Ω ... 001 10Ω ... 100 1kΩ ... 102 100kΩ ... 104
0.5Ω ... 005 18Ω ... 180 2.7kΩ ... 272 680kΩ ... 684
1Ω ... 010 100Ω ... 101 10kΩ ... 103 1MΩ ... 105
6.8Ω ... 068 390Ω ... 391 22kΩ ... 223 4.7MΩ ... 475

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

C*:** CERAMIC CAP.

(1) DD1----370, Ceramic condenser
Disc type
Temp. coeff. P350 — N1000, 50V

①②
② — Capacity value
① — Tolerance

Examples

① Tolerance (Capacity deviation)

±0.25pF ... 0
±0.5pF ... 1
±5% ... 5

* Tolerance of COMMON PARTS handled here are as follows.

0.5pF ~ 5pF ... ±0.25pF
6pF ~ 10pF ... ±0.5pF
12pF ~ 560pF ... ±5pF

② Capacity value

0.5pF ... 005 3pF ... 030 100pF ... 101
1pF ... 010 10pF ... 100 220pF ... 221
1.5pF ... 015 47pF ... 470 560pF ... 561

C*:** CERAMIC CAP.

(1) DK16---300, High dielectric constant ceramic condenser
Disc type
Temp. chara. 2B4, 50V

① — Capacity value

Examples

② Capacity value

100pF ... 101 1000pF ... 102 10000pF ... 103
470pF ... 471 2200pF ... 222

C*:** ELECTROLY CAP. (⫩), FILM CAP. (⫩)

(1) EA------10, Electrolytic condenser
One-way lead type, Tolerance ±20%

① ②
② — Dielectric strength
① — Capacity value

Examples

① Capacity value

0.1μF ... 104 4.7μF ... 475 100μF ... 107
0.33μF ... 334 10μF ... 106 330μF ... 337
1μF ... 105 22μF ... 226 1100μF ... 108
2200μF ... 228

② Working voltage

6.3V ... 006 25V ... 025
10V ... 010 35V ... 035
16V ... 016 50V ... 050

(2) DF15--- 350, Plastic film condenser
One-way type, Mylar ±5% 50V

① — Capacity value

Examples

① Capacity value

0.001μF (1000pF) . . 102 0.1μF ... 104
0.0018μF . . . . 182 0.56μF ... 564
0.01μF . . . . 103 1μF ... 105
0.015μF 153

REF. DESIG.	PART NO.	DESCRIPTION
		PB16-BALANCE AND DIGITAL OUT CIRCUIT BOARD
		PB16-CAPACITORS
CT01	4822 124 41539	ELECT 47μF ±20% 16V
CT02	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CT06	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CT07	4822 122 40617	CERAMIC 0.1μF +80% -20% 50V
C701 ~ C704	4822 124 90386	ELECT 10μF 25 V
C705	4822 121 51144	FILM 1000PF ±2% 125V
C706	4822 121 51144	FILM 1000PF ±2% 125V
C707	4822 124 22238	ELECT 100μF 25V
C708	4822 124 22238	ELECT 100μF 25V
C717	4822 121 51209	FILM 0.015μF ±2% 100V
C718	4822 121 51209	FILM 0.015μF ±2% 100V
C719	4822 123 30093	MICA 5PF ±0.5PF 500V
C720	4822 123 30093	MICA 5PF ±0.5PF 500V
C731 ~ C734	4822 124 22572	ELECT 100μF 63V
C737	4822 124 22736	ELECT 1000μF 25V
C738	4822 124 22736	ELECT 1000μF 25V
C798	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
		PB16-RESISTORS
R701	4822 116 53387	6.81K Ω ±2% 1/4W
R702	4822 116 53387	6.81K Ω ±2% 1/4W
R703	4822 050 24642	4.64K Ω ±2% 1/4W
R704	4822 050 24642	4.64K Ω ±2% 1/4W
R705	4822 116 53387	5.62K Ω ±2% 1/4W
R706	4822 116 53387	5.62K Ω ±2% 1/4W
R707	4822 116 82588	15.4K Ω ±2% 1/4W
R708	4822 116 82588	15.4K Ω ±2% 1/4W
R709	4822 050 21002	1K Ω ±2% 1/4W
R710	4822 050 21002	1K Ω ±2% 1/4W
R711 ~ R714	4822 116 53387	5.62K Ω ±2% 1/4W
R715 ~ R718	4822 050 25621	562 Ω ±2% 1/4W
R719	4822 116 53784	68.1K Ω ±2% 1/4W 100PPM
R720	4822 116 53784	68.1K Ω ±2% 1/4W 100PPM
⚠ R731 ~ ⚠ R734	4822 111 90731	47 Ω ±2% 1/4W FUSE
R737	4822 116 53387	5.62K Ω ±2% 1/4W
R738	4822 116 53387	5.62K Ω ±2% 1/4W
		PB16-SEMICONDUCTORS
D703	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
QT01	4822 209 72503	IC 74HC04
QT02	4822 209 73951	IC, RESET PST523D (4.2V LOW)
Q701 ~ Q704	4822 209 70226	IC, OP AMP NJM5534D
		PB16-MISCELLANEOUS
JT01	4822 267 40793	PLUG, 5P
JT02	4822 265 20354	TERMINAL, 1P RCA
JT04	4822 267 31219	JACK, OPTICAL. TOTX174
J701	4822 265 10079	PLUG, 9P
J703	4822 265 30473	PLUG, 6P (FOR BAL. OUT)
LT01	4822 158 60605	FERRITE CORE, BEADS

REF. DESIG.	PART NO.	DESCRIPTION
LT02	4822 142 60388	PULSE TRANSFORMER
L701	4822 148 80787	OUTPUT TRANSFORMER, LINE (L-CH)
L702	4822 148 80787	OUTPUT TRANSFORMER, LINE (R-CH)
L703	4822 280 20448	RELAY, DC9V RA-9W-K MUTING
L705 ≀ L708	4822 158 60605	FERRITE CORE, BEADS
W071	4822 321 60772	CONNECTIVE CORD, BALANCE OUT
		PD16-DAC CIRCUIT BOARD
		PD16-CAPACITORS
CD01 ≀ CD08	4822 126 12061	CERAMIC 0.1μF ± 10% 25V, CHIP
CD09	4822 123 30363	MICA 820PF ± 5%, CHIP
CD10	4822 123 30363	MICA 820PF ± 5%, CHIP
CD11 ≀ CD14	4822 123 30359	MICA 220PF ± 5% 100WV, CHIP
CD17 ≀ CD22	4822 123 30359	MICA 220PF ± 5% 100WV, CHIP
CD23	4822 123 30363	MICA 820PF ± 5%, CHIP
CD24	4822 123 30363	MICA 820PF ± 5%, CHIP
CD25 ≀ CD34	4822 126 12061	CERAMIC 0.1μF ± 10% 25V, CHIP
CD51 ≀ CD54	4822 126 12061	CERAMIC 0.1μF ± 10% 25V, CHIP
CD61 ≀ CD64	4822 124 90353	ELECT 100μF ± 20% 10V
CD65 ≀ CD68	4822 124 90363	ELECT 220μF ± 20% 10V
C561	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C562	4822 124 41539	ELECT 47μF 16V
C563	4822 122 33677	CERAMIC 27PF ± 5%, CHIP
C564	4822 122 33677	CERAMIC 27PF ± 5%, CHIP
C565	4822 124 41539	ELECT 47μF ± 20% 16V
C566	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C567	4822 124 41539	ELECT 47 μF ± 20% 16V
C568	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C569	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C570	4822 122 32686	CERAMIC 100PF ± 5%, CHIP
C571	4822 122 32686	CERAMIC 100PF ± 5%, CHIP
C572	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C578	4822 122 32669	CERAMIC 47000μF +80% -20%, CHIP
C601 ≀ C604	4822 121 30361	MICA 56PF ± 5% 500WV, CHIP
C605	4822 121 51126	FILM 2200PF ± 2% 125V
C606	4822 121 51126	FILM 2200PF ± 2% 125V
C607	4822 123 30362	MICA 56PF ± 5%, CHIP
C608	4822 123 30362	MICA 56PF ± 5%, CHIP
C611 ≀ C618	4822 124 22238	ELECT 100μF 25V
C621 ≀ C628	4822 122 33136	CERAMIC 0.022μF ± 10%, CHIP

REF. DESIG.	PART NO.	DESCRIPTION
		PD16-RESISTORS
⚠ RD01 ≀ ⚠ RD04	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
RD05	4822 111 91369	1.5K Ω ± 5% 1/10W, CHIP
RD06	4822 111 91369	1.5K Ω ± 5% 1/10W, CHIP
RD07	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD08	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD09	4822 116 83352	560 Ω ± 5% 1/10W, CHIP
RD10	4822 116 83352	560 Ω ± 5% 1/10W, CHIP
RD11	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD12	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD13 ≀ RD16	4822 111 91355	13K Ω ± 1% 1/10W, CHIP
⚠ RD17 ≀ ⚠ RD20	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
RD21 ≀ RD24	4822 111 91355	13K Ω ± 1% 1/10W, CHIP
RD25	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD26	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
RD27	4822 116 83352	560 Ω ± 5% 1/10W, CHIP
RD28	4822 116 83352	560 Ω ± 5% 1/10W, CHIP
RD29	4822 111 91369	1.5K Ω ± 5% 1/10W, CHIP
RD30	4822 111 91369	1.5K Ω ± 5% 1/10W, CHIP
RD31	4822 116 83255	3.3K Ω ± 5% 1/10W, CHIP
RD32	4822 116 83255	3.3K Ω ± 5% 1/10W, CHIP
⚠ RD33 ≀ ⚠ RD38	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
⚠ R561	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
R562	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
R563	4822 111 90894	1K Ω ± 5% 1/10W, CHIP
R564	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
⚠ R565	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
R566	4822 111 90893	100 Ω ± 5% 1/10W, CHIP
R569	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
R572	4822 111 90893	100 Ω ± 5% 1/10W, CHIP
R573	4822 111 90893	100 Ω ± 5% 1/10W, CHIP
⚠ R590	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
R601	4822 111 90883	10K Ω ± 1% 1/10W, CHIP
R602	4822 111 90883	10K Ω ± 1% 1/10W, CHIP
R603 ≀ R606	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
R607	4822 111 90883	10K Ω ± 1% 1/10W, CHIP
R608	4822 111 90883	10K Ω ± 1% 1/10W, CHIP
R609 ≀ R612	4822 116 83255	3.3K Ω ± 1% 1/10W, CHIP
R613 ≀ R620	4822 111 90883	10K Ω ± 1% 1/10W, CHIP
R621 ≀ R624	4822 116 83232	8.2K Ω ± 1% 1/10W, CHIP
R625 ≀ R628	4822 116 83608	2.61K Ω ± 1% 1/10W, CHIP
⚠ R629 ≀ ⚠ R636	4822 111 90731	47 Ω ± 2% 1/4W , FUSE
R639	4822 111 90892	0 Ω ± 5% 1/10W, CHIP
R640	4822 111 90892	0 Ω ± 5% 1/10W, CHIP
		PD16-SEMICONDUCTORS
QD01	4822 209 31013	IC, DAC7 TDA1547 1 BIT DAC
QD02	4822 209 31013	IC, DAC7 TDA1547 1 BIT DAC

REF. DESIG.	PART NO.	DESCRIPTION
Q561	4822 209 30438	IC, BS DAC SAA7350
Q562	4822 209 31016	MICROPROCESSOR, LC6528CH QFP
Q563	4822 209 31011	IC, DIGTAL FIL SM5803APT
Q564	4822 209 61494	IC 74HC74F
Q565	4822 209 62764	IC 74HC164F
Q566	4822 209 62764	IC 74HC164F
Q567	4822 209 31014	IC 74HC04F
Q601	4822 209 83359	IC, OP AMP NJM5532M
Q602	4822 209 83359	IC, OP AMP NJM5532M
Q603 ≀ Q606	4822 209 30062	IC, OP AMP NJM5534M FLAT
		PD16-MISCELLANEOUS
J601	4822 265 10079	PLUG, 9P
L601	4822 157 53873	CHOKE COIL 100µH
L602	4822 157 53873	CHOKE COIL 100µH
X561	4822 242 72395	CRYSTAL, 11.2896MHZ
X562	4822 242 72223	CERAMIC VIBRATOR, CERALOCK CST4.00MGW
		PP16-POWER AND AUDIO CIRCUIT BOARD
		PP16-CAPACITORS
CN01	4822 124 90357	ELECT 2.2µF ± 20% 50V
C651	4822 123 30093	MICA 5PF ± 0.5PF 500V
C652	4822 123 30093	MICA 5PF ± 0.5PF 500V
C653 ≀ C656	4822 124 23398	ELECT 220µF 10V
C657 ≀ C660	4822 124 22572	ELECT 100µF 63V
C663	4822 124 90058	ELECT 47µF 25V
C664	4822 124 90058	ELECT 47µF 25V
C830	4822 122 40491	CERAMIC 0.022µF +80% -20% 50V
C834	4822 124 22239	ELECT 3300µF 25V
C835	4822 124 22239	ELECT 3300µF 25V
C836	4822 124 90364	ELECT 220µF ± 20% 16V
C837	4822 124 90364	ELECT 220µF ± 20% 16V
C838	4822 124 23649	ELECT 470µF 25V
C840	4822 122 40491	CERAMIC 0.022µF +80% -20% 50V
C842	4822 124 90388	ELECT 3300µF 16V
C845	4822 124 90364	ELECT 220µF 16V
C853	4822 124 42037	ELECT 6800µF ± 20% 35V
C854	4822 124 42037	ELECT 6800µF ± 20% 35V
C855	4822 124 23364	ELECT 47µF ± 20% 50V
C856	4822 124 23364	ELECT 47µF ± 20% 50V
C857	4822 124 22734	ELECT 470µF 25V
C858	4822 124 22734	ELECT 470µF 25V
C863	4822 124 23363	ELECT 220µF 6.3V
C864	4822 124 90364	ELECT 220µF 16V
C872	4822 124 90364	ELECT 220µF 16V
C873	4822 124 23363	ELECT 220µF 6.3V
		PP16-RESISTORS
R651	4822 050 21001	100 Ω ± 2% 1/4W 100PPM
R652	4822 050 21001	100 Ω ± 2% 1/4W 100PPM
R653	4822 050 24642	4.64K Ω ± 2% 1/4W
R654	4822 050 24642	4.64K Ω ± 2% 1/4W
R655	4822 050 24643	46.4K Ω ± 2% 1/4W
R656	4822 050 24643	46.4K Ω ± 2% 1/4W
R657	4822 116 53791	1.54K Ω ± 2% 1/4W
R658	4822 116 53791	1.54K Ω ± 2% 1/4W
R659	4822 050 21001	100 Ω ± 2% 1/4W
R660	4822 050 21001	100 Ω ± 2% 1/4W

REF. DESIG.	PART NO.	DESCRIPTION
R661	4822 050 21003	10K Ω ± 2% 1/4W
R662	4822 050 21003	10K Ω ± 2% 1/4W
R663	4822 050 22153	21.5K Ω ± 2% 1/4W
R664	4822 050 22153	21.5K Ω ± 2% 1/4W
⚠ R691 ≀ ⚠ R694	4822 111 90731	47 Ω ± 2% 1/4W, FUSE
R801	4822 116 53387	6.81K Ω ± 2% 1/4W
R802	4822 116 53387	6.81K Ω ± 2% 1/4W
R803 ≀ R806	4822 116 53297	1.78K Ω ± 2% 1/4W
R807	4822 050 21212	1.21K Ω ± 2% 1/4W
R808	4822 050 21212	1.21K Ω ± 2% 1/4W
R809	4822 116 53297	1.78K Ω ± 2% 1/4W 100PPM
R810	4822 116 53297	1.78K Ω ± 2% 1/4W 100PPM
R811	4822 050 21212	1.21K Ω ± 2% 1/4W
R812	4822 050 21212	1.21K Ω ± 2% 1/4W
⚠ R813	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE [/20G]
⚠ R814	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE [/20G]
R862	4822 050 21002	1K Ω ± 2% 1/4W
R863	4822 050 21002	1K Ω ± 2% 1/4W
R864	4822 116 53297	1.78K Ω ± 2% 1/4W
R866	4822 050 21212	1.21K Ω ± 2% 1/4W
R867	4822 050 25621	562 Ω ± 2% 1/4W
R872	4822 050 25621	562 Ω ± 2% 1/4W
R873	4822 050 21002	1K Ω ± 2% 1/4W
R874	4822 050 21212	1.21K Ω ± 2% 1/4W
R875	4822 050 21002	1K Ω ± 2% 1/4W
R876	4822 116 53297	1.78K Ω ± 2% 1/4W
		PP16-SEMICONDUCTORS
D651	4822 130 33305	DIODE 1SS176, MA165, 1SS245 30V 0.1A
⚠ D831	4822 130 80907	DIODE S2VB20
⚠ D841 ≀ ⚠ D844	4822 130 32508	DIODE RL103E, DSF10C
⚠ D851 ≀ ⚠ D854	4822 130 33074	DIODE 30DF-2 200V 3A
D855	4822 130 33664	ZENER DIODE HZ6L(3) 6.2V
D856	4822 130 33664	ZENER DIODE HZ6L(3) 6.2V
D861	4822 130 82956	ZENER DIODE HZ2CLL
D871	4822 130 82956	ZENER DIODE HZ2CLL
D872	4822 130 33759	ZENER DIODE, 0.4AZ4.7, RD4.7ES, MTZJ4.7B
QN01	4822 209 83312	IC, LYRAY DRIVE TA7317P
Q651	4822 209 70226	IC, OP AMP NJM5534D
Q652	4822 209 70226	IC, OP AMP NJM5534D
⚠ Q851	4822 130 43023	TRANSISTOR 2SA1306 (O, Y)
⚠ Q852	4822 130 43311	TRANSISTOR 2SC3298 (O, Y)
⚠ Q853	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
⚠ Q854	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
Q855	4822 130 60107	TRANSISTOR 2SC1048 (Y, GR)
Q856	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
⚠ Q861	4822 130 43311	TRANSISTOR 2SC3298 (O, Y)
Q862	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
Q863	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
Q864	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
⚠ Q871	4822 130 43023	TRANSISTOR 2SA1306 (O, Y)
Q872	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
Q873	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
		PP16-MISCELLANEOUS
⚠ F831	4822 070 38001	FUSE, T 800MA.BS.SEMKO.ETC [/20G]
⚠ F832	4822 070 38001	FUSE, T 800MA.BS.SEMKO.ETC [/20G]
⚠ F841	4822 070 38001	FUSE, T 800MA.BS.SEMKO.ETC [/20G]

REF. DESIG.	PART NO.	DESCRIPTION
⚠ F851	4822 070 38001	FUSE, T 800MA.BS.SEMKO.ETC [/20G]
⚠ F852	4822 070 38001	FUSE, T 800MA.BS.SEMKO.ETC [/20G]
J602	4822 267 30955	TERMINAL, 2P RCA JACK (GOLD)
J603	4822 265 10079	PLUG, 9P
J801	4822 265 30945	PLUG, 5P
J802	4822 265 30944	PLUG, 3P
J803	4822 265 41197	PLUG, 7P
J804	4822 265 10079	PLUG, 9P
⚠ J831	4822 256 30329	JACK, FUSE HOLDER
⚠ J832	4822 267 30978	JACK, FUSE HOLDER
⚠ J833	4822 256 30329	JACK, FUSE HOLDER
⚠ J834	4822 267 30978	JACK, FUSE HOLDER
⚠ J841	4822 256 30329	JACK, FUSE HOLDER
⚠ J842	4822 267 30978	JACK, FUSE HOLDER
⚠ J851	4822 256 30329	JACK, FUSE HOLDER
⚠ J852	4822 267 30978	JACK, FUSE HOLDER
⚠ J853	4822 256 30329	JACK, FUSE HOLDER
⚠ J854	4822 267 30978	JACK, FUSE HOLDER
L651	4822 280 20448	RELAY, DC9V RA-9W-K FOR MUTING
L653	4822 158 60605	FERRITE CORE, BEADS
L654	4822 158 60605	FERRITE CORE, BEADS
		PP26-REGULATOR CIRCUIT BOARD
		PP26-SEMICONDUCTORS
⚠ Q831	4822 209 62762	IC, REGULATOR NJN7909FA -9V 1A
⚠ Q832	4822 209 62761	IC, REGULATOR NJM7809FA +9V 1A
⚠ Q841	4822 209 71903	IC, REGULATOR NJM7805FA +5V 1A
		PS26-POWER SWITCH CIRCUIT BOARD
		PS26-MISCELLANEOUS
SH02	4822 276 11141	PUSH SWITCH, POWER SW.
		PU16-DECODER AND CONTROL CIRCUIT BOARD
		PU16-CAPACITORS
CF03	4822 124 22274	ELECT 4.7µF 50V
CF04	4822 124 41539	ELECT 47µF 16V
CF05	4722 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF06	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF07	4822 124 41539	ELECT 47µF 16V
CF08	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF09	4822 124 41539	ELECT 47µF 16V
CF10	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF13	4822 124 41539	ELECT 47µF 16V
CF14	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF17 ≀ CF19	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
CF20	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
CF50	4822 122 32669	CERAMIC 0.047µF +80%- 20%, CHIP
CM01	4822 124 22274	ELECT 4.7 µF 50V
CM04	4822 122 33689	CERAMIC 0.01µF ± 10%, CHIP
CM05	4822 122 33689	CERAMIC 0.01µF ± 10%, CHIP
CM07	4822 122 33714	CERAMIC 0.1µF +80% -20% , CHIP
CM08	4822 122 33714	CERAMIC 0.1µF +80% -20% , CHIP
CM09	4822 122 33136	CERAMIC 0.022µF ± 10%, CHIP
C154	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
C155	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP

REF. DESIG.	PART NO.	DESCRIPTION
C156	4822 124 41539	ELECT 47µF 16V
C157	4822 124 41539	ELECT 47µF 16V
C501	4822 126 11058	CERAMIC 82PF ± 5%, CHIP
C504	4822 124 90357	ELECT 2.2µF 50V
C506	4822 122 33136	CERAMIC 0.022µF ±10%, CHIP
C514	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
C515	4822 124 22274	ELECT 4.7µF 16V
C521	4822 124 41539	ELECT 47µF 16V
C522	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
C523	4822 124 41539	ELECT 47µF 16V
C524	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
C525	4822 122 32669	CERAMIC 0.047µF +80% -20%, CHIP
		PU16-RESISTORS
RF03	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF04	4822 111 90907	22K Ω ± 5% 1/10W, CHIP
RF05 ≀ RF07	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF09 ≀ RF12	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF13	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
RF15	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
⚠ RF22	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
RF23 ≀ RF25	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF26	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
RF29	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF30	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF41 ≀ RF48	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF49	4822 111 90919	47K Ω ± 5% 1/10W, CHIP
RF50	4822 111 90906	2.2K Ω ± 5% 1/10W, CHIP
RF51	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
RF52	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
RF53	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RF99	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
RM01	4822 111 90919	47K Ω ± 5% 1/10W, CHIP
RM02	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
RM03	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
RM06 ≀ RM08	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
RM11	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
R151	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
R152	4822 111 90919	47K Ω ± 5% 1/10W, CHIP
R153	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
R154	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
R155	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
R156	4822 116 83255	3.3K Ω ± 5% 1/10W, CHIP
R157	4822 111 90922	5.6K Ω ± 5% 1/10W, CHIP
R158	4822 111 91368	120K Ω ± 5% 1/10W, CHIP
R159	4822 116 83609	390K Ω ± 5% 1/10W, CHIP
R160	4822 111 90899	15K Ω ± 5% 1/10W, CHIP
R161	4822 111 90918	4.7K Ω ± 5% 1/10W, CHIP
R162	4822 111 90896	100K Ω ± 5% 1/10W, CHIP
R163	4822 111 90919	47K Ω ± 5% 1/10W, CHIP
R164	4822 111 91075	1.2K Ω ± 5% 1/10W, CHIP
R165	4822 111 91368	120K Ω ± 5% 1/10W, CHIP
R501	4822 111 90906	2.2K Ω ± 5% 1/10W, CHIP
R502	4822 111 90907	22K Ω ± 5% 1/10W, CHIP
R503	4822 111 90897	1M Ω ± 5% 1/10W, CHIP
R504	4822 116 81011	75 Ω ± 5% 1/10W, CHIP
R505	4822 111 90916	3.9K Ω ± 5% 1/10W, CHIP
R506	4822 111 90895	10K Ω ± 5% 1/10W, CHIP
R507	4822 111 90908	220K Ω ± 5% 1/10W, CHIP

REF. DESIG.	PART NO.	DESCRIPTION
R508	4822 111 91369	1.5K Ω ± 5% 1/10W, CHIP
R520	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
R523	4822 111 90892	0 Ω ± 5% 1/10W, CHIP
R525	4822 111 90894	1K Ω ± 5% 1/10W, CHIP
		PU16-SEMICONDUCTORS
DM02	4822 130 32635	DIODE MA-151K CHIP
DM03	4822 130 32866	DIODE MA151WA CHIP
DM05	4822 130 32635	DIODE MA-151K CHIP
DM06 ~ DM08	4822 130 32866	DIODE MA151WA CHIP
D151	4822 130 32868	DIODE MA153 CHIP
QF01	4822 209 62768	MICROPROCESSOR, MC68HC11A0P MAIN μ-COM
QF02	4822 209 62756	IC, MC68HC24 EXPANSION FOR μ-COM
QF04	4822 209 52196	IC, ROM FOR CD-11MK2
QF05	4822 209 31015	IC MB74HC373
QF06	4822 209 51273	IC, MSM2816A EE PROM 2K x 8BIT
QF08	4822 209 82377	IC 74HC00 CMOS
QF09	4822 209 82377	IC 74HC00 CMOS
QF11	4822 209 73951	IC, RESET PST523D (4.2V LOW)
QF13	4822 130 60941	DIGITAL TRANSISTOR DTA114EK
QF14	4822 130 90451	DIGITAL TRANSISTOR DTC114EK
QF15	4822 130 61437	DIGITAL TRANSISTOR DTC114YK
QF16	4822 130 61436	DIGITAL TRANSISTOR DTA114YK
QM01	4822 209 83803	IC, DRIVE LB1645N
QM02	4822 209 83803	IC, DRIVE LB1645N
QM03	4822 209 82377	IC 74HC00 CMOS
QM04	4822 130 90449	DIGITAL TRANSISTOR DTC144
QM05 ~ QM07	4822 130 60941	DIGITAL TRANSISTOR DTA114EK
QM08	4822 130 90449	DIGITAL TRANSISTOR DTC144
Q151	4822 209 83357	IC, NJM4560M QFP
Q152	4822 130 42733	TRANSISTOR 2SA1162(G), CHIP
Q153	4822 130 61799	DIGITAL TRANSISTOR DTA144TK
Q501	4822 209 63453	IC, DEM/ERCO SAA7310/H5 QFP
Q502	4822 209 73952	IC, D-RAM MB81416C-15 MN4264P-15
Q503	4822 130 61438	TRANSISTOR 2SA1005 (L, K)
Q504	4822 209 30439	IC, ADOC PCF3523P
Q505	4822 209 63379	IC, 74HC08 FLAT
Q568	4822 209 31012	IC, RESET PST529C (4.5V LOW)
		PU16-MISCELLANEOUS
JF01	4822 265 20551	PLUG, 10P
JF02	4822 265 40772	PLUG, SERVO DATA IN/OUT
JF04	4822 265 30482	PLUG, 4P
JM01	4822 265 41196	PLUG, 12P
J501	4822 265 20551	PLUG, 10P
J502	4822 265 20551	PLUG, 2P
J503	4822 267 40793	PLUG, 5P
J504	4822 267 40793	PLUG, 5P
L501	4822 152 20647	CHOKE COIL, 2.2 μH
XF01	4822 242 73696	CERAMIC VIBRATOR, CST8.00MHZ(MT) 8.0MHZ
		PV16-SERVO CIRCUIT BOARD
		PV16-CAPACITORS
C101	4822 121 42327	FILM 470PF ± 5% 50V
C103	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C110	4822 124 41539	ELECT 47μF ± 20% 16V

REF. DESIG.	PART NO.	DESCRIPTION
C113	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C114	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C126	4822 124 41539	ELECT 47μF ± 20% 16V
C128	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C132	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C133	4822 124 41539	ELECT 47μF ± 20% 16V
C134	4822 124 41539	ELECT 47μF ± 20% 16V
C135	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C136	4822 124 41539	ELECT 47μF ± 20% 16V
C137	4822 122 40306	CERAMIC 0.047μF +80% -20% 50V
C140	4822 124 41539	ELECT 47μF ± 20% 16V
		PV16-RESISTORS
▲ R116	4822 115 90194	15 Ω ± 2% 1/4W , FUSE
R134	4822 100 20681	2.2K Ω TRIMMING, LASER
R136	4822 100 11352	22K Ω TRIMMING, FOCUS OFFSET
▲ R141	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
▲ R146	4822 111 90967	4.7 Ω ± 5% 1/4W, FUSE
		PV16-SEMICONDUCTORS
D132	4822 130 80272	ZENER DIODE, 04AZ7.5, RD7.5ES ETZJ7.5V
D133	4822 130 80272	ZENER DIODE, 04AZ7.5, RD7.5ES ETZJ7.5V
D134	4822 130 32508	DIODE RL103E, DSF10C
Q101	4822 209 30436	IC, HF & FOC TDA8808QFP
Q102	4822 130 61441	TRANSISTOR 2SD1862 (Q,R)
Q103	4822 209 30437	IC, RADIAL TDA8809 QFP
Q106	4822 209 62755	IC, POWER OP TCA0372
▲ Q108	4822 209 30442	IC, REGULATOR NJM79L06A-6V 0.5A
		PV16-MISCELLANEOUS
J101	4822 267 31465	JACK, 14P CONNECT.
J102	4822 265 30482	PLUG, 4P
J103	4822 265 40772	PLUG, 14P
J104	4822 267 40793	PLUG, 5P
		PY16-DISPLAY AND KEY-SENS CIRCUIT BOARD
		PY16-CAPACITORS
CY01	4822 122 40617	CERAMIC 0.1μF +80% -20% 50V
CY02	4822 124 90354	ELECT 100μF ± 20% 16V
CY04	4822 124 22571	ELECT 10μF ± 20% 50V
CY05	5322 122 31626	CERAMIC 100PF ± 5% 50V
CY06	5322 122 31626	CERAMIC 100PF ± 5% 50V
CY07	4822 124 22274	ELECT 4.7μF ± 20% 50V
CY11	4822 124 90354	ELECT 100μF ± 20% 16V
CY12	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CY13	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CY41	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CY51	4822 124 41539	ELECT 47μF ± 20% 16V
CY52	4822 124 41539	ELECT 47μF ± 20% 16V
CY61	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
CY62	4822 124 41536	ELECT 100μF ± 20% 35V
CY63	4822 124 41536	ELECT 100μF ± 20% 35V
CY73	4822 122 40491	CERAMIC 0.022μF +80% -20% 50V
		PY16-SEMICONDUCTORS
DY01 ~ DY05	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY08	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY09	4822 130 80319	ZENER DIODE 04AZ9.1, RD9.1ES, MTZJ9.1C
DY41 ~ DY44	4822 130 80326	L.E.D. LT3D8B RED

REF. DESIG.	PART NO.	DESCRIPTION
DY51 ~ DY53	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY61	4822 130 80839	DIODE S5688G 400V 1A
DY62	4822 130 80839	DIODE S5688G 400V 1A
QY01	4822 209 62769	MICROPROCESSOR µPD7537A
QY05	4822 209 62763	IC TC74HC164BP
QY06 ~ QY13	4822 130 61186	DIGITAL TRANSISTOR DTA114TS
QY41	4822 209 62767	IC 74HC595
QY42 ~ QY45	4822 130 61189	DIGITAL TRANSISTOR DTC114TS
QY51	4822 130 42715	TRANSISTOR 2SA608SP,2SA1048,2SA1309,2SA933S
QY52	4822 130 61189	DIGITAL TRANSISTOR DTC114TS
QY53	4822 130 61186	DIGITAL TRANSISTOR DTA114TS
QY54	4822 130 61441	TRANSISTOR 2SD1862 (Q,R)
		PY16-MISCELLANEOUS
JY01	4822 265 20551	PLUG, 10P
JY02	4822 265 30482	PLUG, 4P
SY01	4822 276 20508	PUSH SWITCH, REPEAT
SY02	4822 276 20508	PUSH SWITCH, FTS
SY03	4822 276 20508	PUSH SWITCH, OPEN
SY04	4822 276 20508	PUSH SWITCH, PREV TRACK
SY05	4822 276 20508	PUSH SWITCH, NEXT TRACK
SY06	4822 276 20508	PUSH SWITCH, PAUSE
SY07	4822 276 20508	PUSH SWITCH, PLAY/REPLAY
SY08	4822 276 20508	PUSH SWITCH, DISP
SY09	4822 276 20508	PUSH SWITCH, STOP/CM
VY01	4822 130 90884	DISPLAY UNIT, 5-BT-83GK
VY02	4822 130 90884	DISPLAY UNIT, 5-BT-83GK
XY01	4822 242 73695	CERAMIC VIBRATOR, CSB590P 590KHZ
ZY01	4822 130 82197	PHOTO UNIT, IR SENSOR PAS-C0615

REF. DESIG.	PART NO.	DESCRIPTION

NOTE ON SAFETY:
Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.